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EDITORS AND PUBLISHERS:

H. A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences, PHILADELPHIA.

C. W. JOHNSON, Curator of the Boston Society of Natural History, BOSTON.

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C. F. ANCEY

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Imp. Berthaud

The Nautilus.

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A REVISION OF THE SOLENOMYACIDÆ.

BY WM. H. DALL.

Having recently to review the species of the Lamarckian genus *Solemya*, and having nearly all the known species for study it was a surprise to find that the group contains three well marked subgenera and several subordinate sections. A full account is in preparation, meanwhile the following synopsis may serve to call attention to the subject:

Genus Solemya Lamarck, 1818.

I. Subgenus *Solemya* s. s.

Ligament amphidetic, chiefly internal. Type *S. australis* Lamarck.

Ligament appearing on the internal face of the valve in advance of the chondrophore.

A. Proximal part of the chondrophore prolonged as a thickened ridge part way across the interior surface of the valve, *S. australis* Lam.

B. Base of the chondrophore divided, anterior part extended as a narrow ridge; posterior part forming a thickened prop to the chondrophore; exposed ligament linear. *S. parkinsonii* Gray.

C. Chondrophore thickened, without props or extended rib. *S. solen* v. Salis.

II. Subgenus *Petrasma* Dall, *nov.* Ligament not exposed internally in front of the chondrophore; type *S. borealis* Totten.

A. Chondrophore supported by two strong props with a deep cavity between them.

1. *S. borealis* Totten.
2. *S. velum* Say.

B. Chondrophore with an anterior prop extended as a slender rib in front of the adductor scar; no posterior prop.

1. *S. occidentalis* Deshayes.
2. *S. pusilla* Gould.
3. *S. panamensis* Dall, n. sp.

C. Chondrophore without props. *S. valvulus* Carpenter.

III. Subgenus *Acharax* Dall, *nov.*

Ligament opisthodetic, wholly external, visible internally only where it crosses the gap between the margins of the valves. Nymphs without props. Type *S. johnsoni* Dall.

1. *S. johnsoni* Dall.
2. *S. patagonica* E. A. Smith.
3. *S. agassizii* Dall, n, sp.
4. *S. ventricosa* Conrad, fossil.
5. *S. grandis* Verrill and Bush.

NOTES.—*S. togata* (Poli) auct., and *S. mediterranea* Lamarck, are synonyms of *S. solen*. *S. japonica* Dunker, is the adult of *S. pusilla* Gould. *S. macrodactyla* Rochebrune and Mabille is probably identical with *S. patagonica*, though the unique type of the latter seems pathologically callous dorsally.

S. protexta Conrad, if not the young of *S. ventricosa* Conrad, from the Miocene of Oregon, probably belongs to *Petrasma*.

S. occidentalis Deshayes, is common to the Mediterranean, West Indies and Gulf of Mexico. *S. panamensis* extends from off Santa Barbara, Cal., to Panama Bay; *S. valvulus* Carpenter, from San Pedro, Cal., to the Gulf of California; *S. agassizii* from off Tillamook Bay, Oregon, south to Aguja Point, Peru, in 1036–1800 fathoms, and *S. johnsoni* Dall, from Puget Sound to Panama Bay in 60 to 1740 fathoms.

The rarity of these species, and the fact that they usually break up into fragments in drying, are probably the reasons why the remarkable differences between the hinges of the different species have not previously attracted attention.

CUBAN NOTES.

BY J. B. HENDERSON, JR.

Mr. C. T. Simpson and the writer this winter yielded to the call of the wild, and we have just concluded another of our collecting orgies in the Antilles. This time we descended upon Cuba, and all of those delights of the chase formerly experienced together in the mountains of Jamaica and Haiti we renewed in this island of conchological joys.

Now the collector with two months at his disposal can pretty well clean up Jamaica, barring, of course, the rareties and the elusive small fry, but Cuba is an altogether different proposition. The island becomes surprisingly large after leaving Havana, and then it is only in the mountains that the really good picking is to be found. Then, too, the mountains seem always to be far away from the railroad or the towns where accommodations are to be found. If all the extensive plains and lowlands of Cuba could be eliminated by some Aladdin's lamp process and the mountain systems shoved up together, as they are in Jamaica, then indeed Cuba would present a field to the snail-hunter that no other place on earth could equal. The mountains are excessively rich in molluscan life, and the species found are for the most part of exceptional beauty and interest. The lowlands are not wholly without their mollusks, only there they are more scattered and difficult to find. The range of the lowland species seems to be much greater than that of the mountain forms. In fact one may travel all day by train and still find quite the same species of land shells. In the moutains, however, the distribution of species is often very restricted, sometimes to one side only of one particular hill. But as a rule a species occurring typically at a certain spot in a range of mountains gradually changes through varietal forms as one follows the range until it acquires a new name, and perhaps still another one later on. Thus it is in Cuba there are so many species of *Urocoptis*, of *Chondropoma*, of *Helicina*, *Eutrochatella*, etc., which belong to strongly-defined groups having a central typical form. One is constantly trying to verify a suspicion that the central typical form represents the ancestor that lived upon the higher land and survived a subsidence of the lower country, and that the other forms of the group are the descendants that have wandered away into new

surroundings and conditions as the island was raised to its present altitude.

There is need for much study on the distribution and evolutionary history of the Cuban land shells, and perhaps right here will be found the answers to some Cuban geological problems that fairly call aloud to the traveler. There is evidence, for instance, that Cuba was not very long ago divided and separated into several islands—a large east and a large west one—with several smaller islands lying between and projecting high above a shallow sea. Almost beyond question there has been a considerable exchange of species between Florida and that portion of Cuba lying directly south of Florida. This may be accounted for most plausibly by the migrating water fowl which divide their seasons between the great swamps of this portion of Cuba, the Everglades in Florida and the more northern waters of the United States.

If the editors of the NAUTILUS can afford me space later on I would like to give accounts of some of our personal experiences in the field, particularly about the southern edge of the great Zapata swamp, at Vignales in the Organ Mountains of Pinar del Rio, and finally of our race to catch those two most astonishing shells, *Urocoptis elliotti* and *U. dautzenbergiana*, which live only upon the lofty cliffs of two isolated mountains near Guane.

NEW MICHIGAN LYMNÆAS.

BY BRYANT WALKER.

A careful review of the *Lymnæas* of Michigan, incident to the preparation of Part II of the Michigan Catalogue, has increased the number of species represented in the state fauna from 18 as recorded in 1894 (Rev. Mich. Moll., p. 11), to 28 at the present time.

In the material examined, the following forms occurred, which seem worthy of specific or varietal recognition:

Lymnæa pilsbryana n. sp., Pl. I, figs. 2, 8–11.

Shell ovate-conic, slightly perforate; dark brownish-yellow, frequently tinged with purple, with a light line just below the suture; whorls 5, convex, with a deeply impressed suture, the three apical whorls small, forming a short conical apex, penultimate whorl twice

as long as the three preceding, inflated and convex, body-whorl large and well rounded; lines of growth strong and regular, cut by numerous fine spiral lines giving a shagreened appearance to the surface, in some specimens the last half of the body whorl is obsoletely malleated; aperture broadly oval, somewhat more than one-half of the entire length of the shell, dark brownish-yellow within, with a liver colored band just within the lip; lip sharp, regularly rounded and slightly expanded toward the basal margin; columella thick, white with a strong fold, broadly reflected over and appressed to the axial region, leaving only a very small perforation, and connected with the upper insertion of the lip by a broad white and rather thick (for the genus) callus; axis thick, solid, twisted.

Alt. (Fig. 8) 22; diam. 13½; length of ap. 13; width 10 mm.

Alt. (Fig. 11) 24; diam. 14; length of ap. 14; width 10 mm.

Type (No. 21345, coll. Walker) from Washington Harbor, Isle Royale, Lake Superior, Mich. Cotypes in the collection of the Philadelphia Academy and Chicago Academy of Sciences.

Immature specimens of this species were first taken by the University of Michigan expedition of 1904, and in the report of that trip (Rep. Geol. Surv. Mich., 1905, Separate, p. 97) was stated to be "related to *L. sumassi* Bd., but probably undescribed."

The expedition of 1905 was fortunate in securing fully-matured specimens. And a comparison of these with a photograph of cotypes of *sumassi* from the British Museum, kindly furnished by Mr. F. C. Baker, of Chicago, showed that the two forms were entirely dissimilar.

The affinities of *pilsbryana* are entirely with *L. emarginata* Say, a species of general distribution through the Great Lakes from Saginaw Bay northward.

It differs from that species in its darker color, more inflated whorls, especially those of the spire, and the entire absence of the emargination characteristic of that species.

L. emarginata was also found on Isle Royale, and there maintained the acute conical spire with a less impressed suture characteristic of the usual form of that species. The axis of the Isle Royale *emarginata* (fig. 1) is more slender, more curved and less twisted than that of *pilsbryana* (fig. 2). Both of these figures are made from immature specimens.

Lymnæa petoskeyensis n. sp., Pl. I, fig. 3, 5–7.

Shell elongate oval, acutely conic, perforate; thin, pale horn-color, almost white, translucent; whorls 6, regularly increasing, convex, with a well impressed suture; spire elongated, acutely conical, apical whorl minute; body whorl somewhat inflated, elongate oval; lines of growth fine and regular, cut by numerous very fine revolving, spiral lines, surface more or less malleated; aperture oval, subangulate above and rounded below, slightly more than one-half the entire length of the shell; lip thin and sharp; columella nearly straight without any fold, inner lip expanded and reflected over the round deep umbilicus and continued as a thick white callus over the parietal wall; where this callus passes over the umbilicus toward the basal margin it is abruptly depressed into the umbilical opening, forming a well marked furrow between the columella and the parietal wall, and giving the appearance of a twist to the face of the columellar enlargement, but the columella itself is scarcely affected by it; the axis is large for the size of the shell, without any trace of a fold, and nearly cylindrical, the base of the preceding whorl abruptly flattened around the insertion of the upper end of the pillar.

Alt. (Fig. 5) 23.5, diam. 11.25, ap. length 13, width 8 mm.

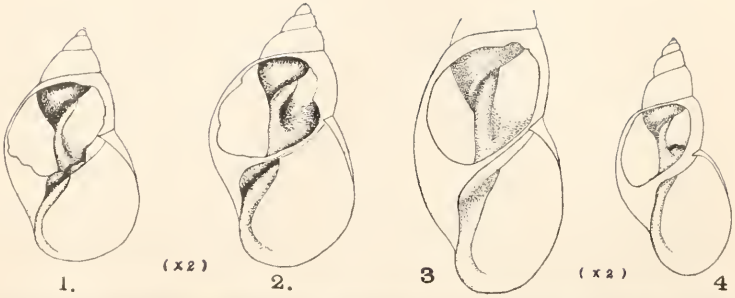
Alt. (Fig. 6) 24.5, diam. 11, ap. length 13.5, width 7.5 mm.

Alt. (Fig. 7) 25, diam. 10.5, ap. length 12, width 7 mm.

Types (No. 14347 coll. Walker) from a small spring-brook flowing into Little Traverse Bay, near Petoskey, Mich. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences.

This species was at first supposed to be a very thin, fragile form of the elongate variety of *L. catascopium*, characteristic of the lake region. But upon cutting into the shell, the peculiar shape of the axis forbade its reference to that species.

Under Dr. Dall's arrangement of *Lymnæa* (Harr. Exp. XIII, p. 64) it would belong to the section *Galba*. Compared with *L. desidiosa* Say, (Fig. 4) the axis of *petoskeyensis* (Fig. 3) is proportionately much larger, more elongated and more cylindrical, but the general features of both are the same. The peculiar contraction of the base of the whorl around the upper end of the pillar, so remarkably developed in *petoskeyensis*, is present, but not at all marked, in *desidiosa*. The umbilicus in *petoskeyensis* is round and deep, and is more conspicuous in the immature shells, as the expansion of the broadly reflected columella nearly covers it in the adult.



NEW MICHIGAN LYMNÆAS.

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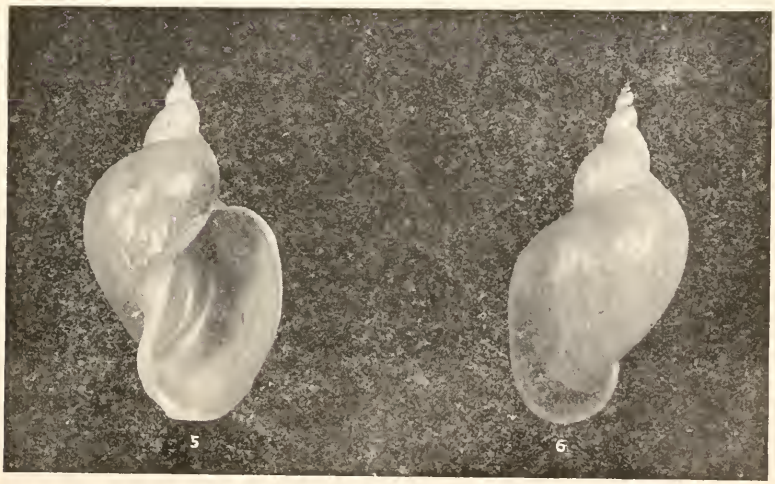

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8

NEW MICHIGAN LYMNÆAS.

The little brook, only a few hundred feet long, in which the species lives, is also the type locality for *Physa walkeri* Crandall.

Lymnæa cyclostoma n. sp. Pl. II, fig. 4.

Shell ovate conic, turreted, umbilicate, light yellowish horn-colored, shining ; lines of growth fine, irregular, subobsolete on the body whorl, stronger on the apical whorls, reticulated by indistinct revolving, impressed spiral lines. Spire elongated, apex subacute ; whorls 5, very convex, those of the spire somewhat shouldered, suture deeply impressed ; body whorl large, inflated, very convex. Aperture broad oval, subcircular, rounded above and below. Columella broadly reflected over the round, deep umbilicus, convex, smooth with no fold, parietal wall with a thin transparent callus. Lip sharp, but thickened within by a heavy white callus.

Alt. 7.5, diam. 3.25 mm.

Types (No. 13599 Coll. Walker) from Indian Creek, Kent County, Mich. Also from Alma, Gratiot County, Mich.

This very distinct little species was first collected by Dr. R. J. Kirkland, of Grand Rapids, Mich., and was listed as *L. cubensis* Pfr. (*umbilicata* C. B. Ads.) in my Review of the Moll. Fauna of Michigan (1894). Through the courtesy of Mr. E. A. Burt, curator of the Museum of Middlebury College, I have been able to examine the specimen of *L. umbilicata* deposited in that museum by Adams, and for comparison have figured it (fig. 1). The two species are so obviously distinct that verbal comparison is hardly necessary. *L. cyclostoma* differs in its more elevated, turreted spire, more broadly reflected columella and thickened white lip. It resembles *umbilicata*, however, in the sculpture, and is no doubt derived from the same stock.

In this connection it may not be out of place to add that the inspection of the authentic specimen of *L. umbilicata* confirms Dr. Pilsbry's reference of that species to *L. cubensis* Pfr. It is evidently distinct from *L. caperata* Say, and its reference to that species as a synonym by Haldeman, Tryon, Binney and others is quite erroneous.

The Middlebury specimen is not quite mature. It has $4\frac{1}{2}$ whorls and measures 6 mm. in height and 4 mm. in diameter. For further comparison I have figured (Fig. 2) a Rhode Island specimen, which is apparently typical ; the dimensions (6.5 x 4.25) agreeing almost precisely with those given by Adams. It is however, somewhat

more inflated than the Middlebury specimen. The apparent fold on the columella is evidently an individual malformation, as it does not appear in any of the other specimens in the same lot. Compared with typical *cubensis* (Fig. 3), *umbilicata* is more globose, with a shorter and more obtuse spire. If the difference holds good for the northern form, *umbilicata* would be entitled to varietal rank.

A single small specimen from Otter Lake (Lapeer? County), Michigan, (Text Fig. 1.) collected by the late Dr. Manly Miles, seems referable to *umbilicata*. It is smaller than the Rhode Island specimens (3.5 x 2) and differs somewhat in shape, the body whorl being somewhat shouldered and the spire more acute and slightly more elevated. But the characteristic axial (longitudinal) sculpture is present although there is no trace of any spiral lines. The lip is decidedly thickened within, and both it and the columella are pink. The umbilicus is not as large as in the Rhode Island form.

Fig. 1.

Lymnæa stagnalis v. perampla n. var. Pl. II, figs. 5 and 6.

This variety differs from the usual North American form, var. *appressa* Say, by its shorter, rapidly acuminating spire and larger, strongly shouldered body whorl; the first three whorls of the spire are slender and increase regularly in size; the penultimate whorl is disproportionately enlarged, swollen and subangulated by the flattening of the upper part of the whorl, which in the body whorl develops into a prominent shoulder.

Alt. (fig. 5) 45.5, diam. 26, length ap. 28, width 18 mm.

Alt. (fig. 6) 45, diam. 23.75, length ap. 26, width 17 mm.

Types (No. 1834 coll. Walker) from Houghton Lake, Roscommon County, Michigan. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences. Also from Douglas Lake near Petoskey, Michigan. All the specimens of *stagnalis* from Houghton Lake that I have seen, more than 30, are of this peculiar form, which apparently a well-marked local race.

I have been informed by the late Dr. W. H. DeCamp that the late A. O. Currier of Grand Rapids, who was the first to make known the peculiar Lymnæids of Houghton Lake, intended to describe this form under the very appropriate name which I have adopted for it.

An elevated, almost scalariform example of this variety was figured in the NAUTILUS, Vol. VI, pl. 1, fig. 6. It is interesting to

note that in Marl Lake a small enlargement of Marl River, which connects Higgins and Houghton Lakes, the typical *L. stagnalis appressa* was the only form found.

Lymnæa desidiosa var. peninsulæ, n. var. Pl. II, fig. 7.

Shell slender, elongated, spire long and acute, subturreted, whorls of the spire very convex, with a very deeply impressed suture, body-whorl elongated, subcylindrical, aperture oval, not very much expanded.

Alt. 13.50, diam. 6.25 mm.

(*To be continued.*)

LIST OF MOLLUSKS FROM AMARILLO, TEXAS.

BY J. B. HENDERSON, JR.

The "Pan Handle" of Texas is a flat, treeless plain where the traveler could make good use of nautical instruments. I could find no vestige of molluscan life there except in the deep cañons, a few of which are encountered on a journey across the "Handle." The following is a list of species taken from one of these cañons at a point about 15 miles S. E. of Amarillo. All were found in drift debris—none actually alive and crawling about. The identifications are by Pilsbry and Vanatta.

Zonitoides singleyana Pils.
Zonitoides minuscula Binn.
Vallonia perspectiva Sterki.
Vallonia gracilicosta Reinh.
Helicodiscus parallelus Say.
Pupoides marginatus Say.
Bifidaria pellucida hordeacella Pils.
Bifidaria tappaniana C. B. Ad.
Bifidaria armifera Say.
Bifidaria procera cristata P. & V.
Vertigo ovata Say.
Planorbis parvus Say.

A few specimens of Physa, Lymnæa and Pisidium too young for identification were also found.

NOTES AND NEWS.

THE NASON COLLECTION.—The University of Illinois has lately acquired the collection of shells of Dr. Wm. A. Nason, of Algonquin, Illinois. The collection numbers approximately 50,000 specimens, representing 10,000 species. Among these are large series of the species found in Illinois, together with many beautiful specimens from various parts of the world.

THE ANCEY LIBRARY.—The books and many of the papers of the late C. F. Ancey can be obtained from Mr. Gerat, 76 rue du Faubourg St. Denis, Paris, France.

NOTE ON CYPRÆA GRACILIS, GASK.—A few months ago, among some small shells from unknown localities which came into my hands, there appeared a small cowry which for a time puzzled me exceedingly, being very different from any of the species then known to me. Upon careful study, however, in connection with the various monographs of the *Cypræidæ*, it has proven unmistakably to be the very rare *Cypræa gracilis*, Gask, the type of which was brought from the China Seas by the "Samarang" and which has since been found only at Mauritius and Reunion I. (Weinkauff, Hidalgo). Although the coloration of the back has been obliterated, the specimen being beach-worn, it has the peculiar lip, the narrow, bent aperture, sparsely scattered reddish-brown dots and fine teeth called for in the Gaskoin description, and it also corresponds, as to base and contour, to the figure in the Sowerby monograph, probably copied by Weinkauff and Roberts. Length, 10 mm.

FRED L. BUTTON.

NOTE ON TRIVIA MAUGERIÆ, GRAY.—Of this very rare species —sometimes also known as Tr. "Maugeri," (Roberts, Hidalgo) and thus far found only at the Galapagos Is.—I have known but three examples in all the West American collections. The first which appeared was a badly bleached one which I detected among the molluscan material brought back by the Stanford University expedition of 1898, the specimen being now in the University collection. The second, a fine one in the Arnheim collection at San Francisco, was unfortunately destroyed in the great fire of 1906; while my own specimen, although beach-worn, is in fair condition and color. Length, 13 mm.—FRED L. BUTTON.

NOTE ON TRIVIA GALAPAGENSIS MELV.—Upon examination of the molluscan material brought back by the Stanford University expedition to the Galapagos Is. in 1898, I noticed this novelty and sent it to Mr. Melvill for description (Ann. & Mag. Nat. Hist., Aug., 1900.) Although the small type lot of this interesting species were all jet black and shiny, I have since then obtained from the same locality another specimen which is clearly referable to this species but which is of a reddish-brown color, while all the other specific characteristics, including the two whitish spots on the back, are well marked. As already noted by me (Jour. of Conch., Oct., 1902) this species proves to be ribbed throughout when perfect, instead of smooth on the back, as described.—FRED L. BUTTON.

PUBLICATIONS RECEIVED.

A SURVEY OF THE SPECIES AND VARIETIES OF PUPA DRAPARNAUD, OCCURRING IN SOUTH AFRICA. By JAMES COSMO MELVILL and JOHN HENRY PONSONBY (Ann. & Mag. Nat. Hist., I, ser. 8, pp. 70–86, pl. i, ii, 1908). The paper is based on a collection made by Mr. Henry C. Burnup, to whom credit is given for two new forms. The figures are excellent. In all 28 species are recorded, with several varieties.

DESCRIPTIONS OF NINE TERRESTRIAL MOLLUSCA FROM SOUTH AFRICA. By JAMES COSMO MELVILL and JOHN HENRY PONSONBY, INCLUDING ANATOMICAL DESCRIPTIONS OF TWO PROPOSED NEW GENERA (*Afrodonta* M. & P. and *Peltatus* G.-A.). By Lt.-Col. H. H. Godwin-Austen (Ann. & Mag. Nat. Hist., I, ser. 8, pp. 129–136, pl. 7 and 8, 1908).

C. F. ANCEY.[1]

César-Marie-Felix Ancey, administrator at Mascara, Algeria, was born in Marseilles, November 15, 1860. His father, well known

[1] Taken in part from the obituary by Mr. H. Fischer (Jour. de Conch., LV, pp. 404–496), to whom we are also indebted through Mr. Geret for the accompanying portrait. A complete list of Mr. Ancey's writings will be found in the above publication, pages 406–412.—EDITORS.

for his publications on entomology and author of valuable work on malacology, encouraged his well-developed inclination for zoölogical studies. At the age of twenty-three he was appointed conservator of the fine Oberthur entomological collection at Rennes. This position not promising material success, he returned to Marseilles, where he studied law, and obtained his diploma in 1885. He then entered the government administration in Algeria; was married in 1889, and the same year was appointed deputy administrator, and filled successively positions at Fort National, Boghari and Dra-el Mizan. After thirteen years spent in that locality he was promoted to acting administrator at Mascara. It was a just reward for his great qualifications and for the esteem which he had been able to win amidst duties that were frequently of a difficult character.

Mr. Ancey hoped shortly to fill a State mission to the Cape Verde Islands, which was sure to furnish opportunities for malacological studies. After a brief illness he died at Mascara, October 10, 1906. His death was a painful surprise to his scientific correspondents.

Most of his writings were on conchology, and his many papers, some 140 in all, give an idea of the importance of his work, devoted principally to the malacological fauna of Hawaii, Central Africa, Polynesia, Central Asia, etc. He was especially interested in the study of the smaller land shells, of which he had a large collection. As his appointment to Mascara promised to be permanent, he expected to be able to work up his large accumulation of undetermined species, still packed just as he had received them. It was his purpose some day to study the land mollusks of Algeria; although thoroughly competent for the work, he hesitated to undertake it on account of the difficulties arising from the many doubtful species, which made the study of the Algerian fauna a most ungrateful task.

Mr. Ancey is authority for many generic or subgeneric names, among which may be mentioned: *Boysidia*, *Parabalia*, *Haplotrema*, *Pseudomphalus*, *Monomphalus*, *Micromphalia*, *Platystoma*, *Rhytidiopsis*, *Pararhytida*, *Microphyura*, *Ochroderma*, *Tomostele*, *Mabilliella*, *Thomsonia*, *Lechaptoisia*, *Thaanumia*, *Baldwinia* and *Armandiella*. The genus *Anceyia* was dedicated to him by Bourguignat. Remarkably gifted and thoroughly acquainted with the bibliography of the subject, he leaves behind him work which marks a real progress in our knowledge of the terrestrial mollusks. His untimely death is a great loss to science.

The Nautilus.

Vol. XXII. JUNE, 1908. No. 2.

A NEW EOCENE FOSSIL FROM CLAIBORNE.

BY T. H. ALDRICH.

MITROMORPHA EOCENENSIS, n. sp.

Shell small, but five whorls remaining (the embryonic whorls are broken off), sulcate, the longitudinals close set and prominent, the spirals the same on the smaller whorls, but on the body whorl more prominent at the suture and the base; suture distinct and rather deep; outer lip denticulated; pillar lip with two tubercles, the one nearest the canal long and tapering. Canal short, slightly widened and slightly twisted.

Length 7 mm., breadth 3 mm.

Locality: Claiborne Sand Bed, Claiborne, Alabama.

Remarks: In *Mitromorpha pygmaea* Dall and others examined, the spiral sculpture seems to predominate, but in the species described above the longitudinal is the stronger.

TWO INTERESTING NEW ENGLAND NUDIBRANCH RECORDS.

BY FRANCIS N. BALCH.

The absolutely lamentable state of our present knowledge (or rather ignorance) of the New England Nudibranchs is in no small part due to the capricious and baffling occurrence of that interesting

group. Here to-day and gone to-morrow, perhaps abundant one year and not observed again for decades, even on shores where they are in most years common if rightly sought at the right season, they remain practically unknown to many whose collecting is done only in summer.

A good deal of evidence has accumulated to show that many of the forms, chiefly Aeolidians, have a peculiar life-history, somewhat as follows: Coming on the shore in early spring they breed in the rock-pools or not far below low-water mark, and almost immediately die. The young, growing slowly at first and escaping observation by reason of their minute size and often marvelously "protective" (?) coloration, work their way slowly off shore with the coming of warmer weather, migrating still further out as the cold sets in, and attain their growth over winter in comparatively deep water, only to perform the reverse migration, breed and die the next spring. They are thus annuals. This is supposed to be the case particularly with Aeolidian forms, but not even for them is the theory universally accepted. There are certainly grave objections to it. It has been urged that neither the on-shore nor the off-shore migration has been followed; that the young ought not to escape observation over summer even though minute and inconspicuous; that they occasionally, though rarely, occur in summer adult or nearly so; that the dredge fails to reveal them of nearly adult size in winter when they should occur. On the other hand it is a fact that many of the species have a fairly definite season (usually early spring, more rarely late autumn, and still more rarely at other times) when in most years they are with us in fair numbers and of full size, and thereafter—and suddenly—thence depart and are seen no more till the next year at the same season or perhaps many years later at the same season. This holds good of the rocky shores in the neighborhood of Boston, and I imagine few of us have ever seen there, except in spring, more than very scant and scattering examples of the Aeolid type.

The following captures, therefore, have a distinct interest, even though, by the fault of the writer, it is much less than it should be.

On November 15, 1905, Owen Bryant, Esq., of Cohasset, Mass., took from kelp dislodged by a storm from water of moderate (but uncertain) depth more than sixty Nudibranchs of at least eleven different species practically in company at that one spot. Not one was very young (less than say 3–4 mm.) Not one was adult.

He very kindly notified me and gave a Sunday to a trip to Cohasset where I saw the remarkable haul still alive. The early darkness of a November afternoon, the absence of apparatus and books and my absorption in professional work which precluded the possibility of my attempting to transport and preserve the living creatures for further study, may be held sufficient excuse for my failure to identify the species at the time fully and reliably, but not for my apparent failure to preserve some of the more interesting forms for later working over. To my great regret, however, the single Dorid form is the only one I am now able to find.

The species identified were as follows according to my notes:

Cratena gymnota (Couth.). "1 specimen quite juv., cores of cerata very dark."

? *Cratena veronicae* Verrill. "1 specimen, abt. $\frac{3}{4}$ in., cerata very green, *very* like viridis A. & H." *

Coryphella mananensis (Stimps.) "1 specimen, abt. $\frac{1}{2}$ in., juv."

? *Coryphella salmonacea* (Couth.). "> *diversa* Couth., 1 nearly adult spec., abt. 1 in." Unfortunately *salmonacea* (Couth.,) [now Bergh] does *not* include *diversa* (Couth.), as I then supposed, and both species are in utmost need of further elucidation. Wherefore I much regret my failure to preserve this specimen as a consequence of which I am now quite unable to say what I really had before me—at all events something wholly distinct from *mananensis*.

Dendronotus frondosus (Ascanius). "3 specimens, abt. 1 in."

Dendronotus robustus Verrill. "1 specimen, abt. $\frac{3}{4}$ in."

Palio lessonii (d'Orb.) "2 specimens, abt. $\frac{1}{2}$ in., like A. & H's. figures of adult but anal tubercles very conspicuous and white instead of yellow."

Lamellidoris aspera (A. & H.) > *pallida* A. Ag. "1 specimen, juv., abt. $\frac{1}{2}$ in."

The above enumeration certainly includes all the species (and likewise all the specimens) of all except the Aeolid forms. But of the Aeolid species enumerated there were in all likelihood many more specimens, while I noted that there were at least three obviously different Aeolid species which I did not undertake to name. Quite probably there were more. The whole enumeration only

* I had Alder & Hancock's figure before me in making the comparison.

accounts for eleven specimens out of more than sixty. I only had time to note the larger and more conspicuous ones.

On September 19, 1907, Mr. Bryant made a somewhat similar haul, although less interesting. He most kindly brought the material to me still alive, and I was able to study it more adequately.

There were twenty-nine specimens of three species, and all were taken together from the bottom of a floating clam-car.

The species were as follows:

Facelina bostoniensis (Couth.) now *Coryphella bostoniensis* (Couth.). Bergh et auct. al. Europ., "7 specimens, 4 to 10 mm."

Coryphella mananesis (Stimps.). "2 specimens, 8 mm., 14 mm."

Palio lessonii (d'Orb.). "20 specimens, 1 abt. 12 mm., the rest abt. 5 mm. Seem browner in coloration and much more sparsely tuberculated, with relatively more conspicuous circum-anal tubercles than the European type as figured."

It will be noted that here again not one is adult, while not one is very young.

It seems to me that these two captures suggest strongly an autumnal condensation of the half-grown *Nudibranch* population (of certain groups) in moderate depths, just off the shore perhaps, best explained tentatively as a "wave of migration" to deeper water for the winter. It is clear enough how a population, which would be very sparse if spread over the whole area from three fathoms, let us say, to extreme low-water mark, might be much condensed if the cooling waters or failing food supply set them all moving off shore about the same time, only to check and bank up at the edge of some particular deep channel or cold current or on some specially favorable hunting-ground which all hitherto living anywhere inshore of it must cross.

NEW MICHIGAN LYMNÆAS.

BY BRYANT WALKER.

(*Concluded.*)

Lymnæa desidiosa peninsulæ

Types (No. 20040 Coll. Walker) from the headwaters of the Union River, Ontonagon County, Michigan. Cotypes in the collections of the Philadelphia Academy and the Chicago Academy of Sciences. Also from Little Iron River, Ontonagon Co., Salmon

Trout River, Marquette Co., and the St. Mary's River at Saulte Ste. Marie, Mich.

This variety differs from the usual and more typical form (pl. I, fig. 4 and pl. II, fig. 8) of general distribution in the lower Peninsula, by its slender, elongated form. It is apparently characteristic of the small rivers tributary to Lake Superior. With the exception of a few specimens from Saulte Ste. Marie, the typical form of *desidiosa* has not been as yet found in the Upper Peninsula at all. *Peninsulæ* is very similar in shape to a small form of general distribution through the State, which is probably referable to some one of Lea's indefinite species, but differs by its much greater size, being twice as long with the same number of whorls. As a characteristic local form of a large region, it seems worthy of a name.

Lymnæa davisi n. sp. Pl. II, fig. 9–10.

Shell of medium size, globose-conic; perforate; light horn-color; whorls 5; the spire about one-third of the entire length of the shell, rapidly acuminating and with a minute, sharp apex; the whorls of the spire are flattened and but slightly convex, with a distinct, but not deeply impressed, suture; body whorl large, inflated, ovate, flattened above and rounded below; lines of growth distinct, fine and regular, minutely decussated with revolving spiral lines; aperture large, pear-shaped, acutely angled above and broadly rounded below, about three-fifths of the entire length, lip sharp, slightly thickened within, straight above, somewhat expanded below, broadly reflected over and nearly covering the small umbilical perforation; columella with a very slight fold; axis rather thick, round, scarcely if at all folded.

Alt. (Fig. 9) 15.2, diam. 7.5 mm.

Alt. (Fig. 10) 15, diam. 7.5 mm.

Types (No. 20092 coll. Walker) from Fish Point, Tuscola County, Mich. This species is well characterized by its large, ovate body whorl and its very acute spire; the apical whorls are flattened and the straight line of spire is prolonged over the upper part of the body, giving a "pot-bellied" appearance to the shell.

Named in honor of Prof. Charles A. Davis of Ann Arbor, its discoverer, in recognition of the many valuable contributions he has made to our knowledge of the distribution of the mollusca in Michigan.

Lymnæa bakeri n. sp. Pl. II, figs. 11–12.

Shell slender, elongate, perforate; whorls 5; spire elongated, turreted; apex acute; body whorl narrow, elongated, compressed below; suture deeply impressed; lines of growth fine and regular with fine subobsolete, revolving, spiral lines; aperture narrow, elongated, within the flare of the lip, the sides are nearly parallel, and about equally rounded above and below; lip thin, sharp, suddenly and broadly expanded, subreflected, continuous, not appressed to the parietal wall, and roundly reflected over the perforation, columella straight, without a fold; axis round and smooth.

Alt. (fig. 12) 16.5, diam. 7.5, length ap. 8.5, width 4.5 mm.

Types (No. 9353 Coll. Walker) from Pine Lake, Charlevoix County, Mich.

This remarkable species was dredged from the marl bottom of Pine Lake. No living specimens were found, and in all probability it is extinct. In its external characteristics it is more nearly related to *L. jayi* Dunker (*gracilis* Jay) than to any other of the described species, but the resemblance is a general one only, the two species differing in nearly every detail. The continuous, free lip and straight columella are exceedingly like those of *jayi*, and would naturally cause it to be referred to the subgenus *Acella*. But the axis is not gyrate, as in that group, but is rounded and without a fold, as in *Galba*.

The young shell (fig. 11) is subcylindrical, and with its heavily-shouldered, turreted whorls and narrow aperture reminds one of the curious *L. contracta* Currier from Houghton Lake. I take pleasure in dedicating this very peculiar species to Mr. Frank C. Baker, of the Chicago Academy of Sciences, who has made a special study of the North American *Lymnæas*.

Explanation of Plates.

PLATE I.

Figures 1–4 inclusive are enlarged. The remainder are of natural size.

Fig. 1. *L. emarginata* Say (immature), Isle Royal, Mich.

Figs. 2, 9 and 10. *L. pilsbryana* Walker (immature), Isle Royal, Mich.

Fig. 3. *L. petoskeyensis* Walker, Petoskey, Mich.

Fig. 4. *L. desidiosa* Say, Ann Arbor, Mich.

Figs. 5, 6 and 7. *L. petoskeyensis* Walker (types), Petoskey, Mich.

Figs. 8 and 11. *L. pilsbryana* Walker (types), Isle Royal, Mich.

PLATE II.

Figures 1 to 4 inclusive are enlarged on the same scale. Figures 7 and 8 are also equally enlarged, but on a smaller scale. Figures 5, 6 and 9 to 12 inclusive are natural size.

Fig. 1. *L. umbilicata* C. B. Ads. (ex auct.), New Bedford, R. I.

Fig. 2. *L. umbilicata*, Rhode Island.

Fig. 3. *L. cubensis* Pfr., Enterprise, Fla.

Fig. 4. *L. cyclostoma* Walker (types), Indian Creek, Kent County, Mich.

Figs. 5 and 6. *L. stagnalis perampla* Walker (types), Houghton Lake, Mich.

Fig. 7. *L. desidiosa peninsulæ* Walker (types), Union R., Ontonagon, County, Mich.

Fig. 8. *L. desidiosa* Say, Oakland County, Mich.

Figs. 9 and 10. *L. davisi* Walker (types), Fish Point, Tuscola County, Mich.

Fig. 11. *L. bakeri* Walker (young) Pine Lake, Charlevoix, Mich.

Fig. 12. *L. bakeri* (type), Pine Lake, Charlevoix, Mich.

ADDITIONAL SHELLS FOUND IN AROOSTOOK COUNTY, MAINE.

BY OLAF O. NYLANDER.

Circinaria concava Say, one small living shell of this species found at Sherman, in 1904.

Physa sayii, Tappan, very fine, large specimens found in Callen's mill pound, Caribou stream, Caribou, Maine, at Salmon brook, Lake Perham and in the dead water on Salmon brook in Woodland.

Lymnæa palustris Mull., a large colony of this species was found in a small brook on G. C. Hall's farm 3 miles south of Caribou village.

Planorbis bicarinatus var. The carinations on this are extremely developed; Portage Lake, Square Lake and Cross Lake all on Fish River.

Volvata sincera var. *nylanderi* Dall., Portage Lake, Square Lake and Cross Lake, dredged at various depths to 25 feet.

NOTE ON LYMNAEA DESIDIOSA SAY.

BY FRANK COLLINS BAKER.

An examination of Say's specimens of *L. desidiosa* in the Academy of Natural Sciences of Philadelphia reveals the fact that all subsequent naturalists have misunderstood this species and have given the name to a species belonging to a different group of Lymnaeas. The true *desidiosa* is a member of the *palustris* group, as shown by Say's specimens and by a close study of Say's descriptions. The two specimens in the Philadelphia Academy may be described as follows:

Shell oblong-ovate, rather solid, color pale horn; surface dull, lines of growth crowded, conspicuous, crossed by impressed spiral lines; whorls $5\frac{1}{2}$, convex; the body whorl is quite convex; spire acutely conic, about as long as the aperture; sutures well impressed; apex of $1\frac{1}{2}$ whorls, brownish horn; aperture long ovate; outer lip thin, with an internal rib or varix; inner lip reflected over and appressed to the parietal wall, leaving a small umbilical chink; columelar axis with a distinct plait.

Length 15.00, breadth 7.50, aperture length 8.00, breadth 3.00 mill.

Length 14.25, breadth 7.50, aperture length 7.75, breadth 3.50 mill.

The specimens bear the following label in the original handwriting:

Lymnaea desidiosa Say, Journ. Acad., v. 2, p. 169. T. Say, Penn. ? (No. 58731).

The figure in Binney (fig. 68) is said to be from an authentic specimen in the Philadelphia Academy, but no such specimen is now in existence, nor are the specimens mentioned from Cayuga Lake to be found. In the absence of any other authentic material Say's specimens must be taken as typical of *desidiosa*. A close analysis of Say's description would seem to indicate that he did not have the shell before him which has so long borne the name of *desidiosa*. He says "It is closely allied to *elodes*, but the whorls are more convex, one less in number, and the two terminal ones are proportionately smaller."[1] This statement is repeated in the American Conchology. This statement of its relation to *elodes* would

[1] Journ. Acad. Nat. Sci., ii, p. 169.

scarcely have been made by Say, who possessed a peculiarly discriminating sense of minute differences between shells, if he had been describing the shell now known as *desidiosa*. The size of the Philadelphia specimens (15 mill.) also corresponds pretty well with the size given by Say ($\frac{7}{10}$ of an inch = about 17 mill.). The most convincing fact to the writer is the presence of a specimen of "*desidiosa*" of authors in the Philadelphia Academy marked "*Lymnaea* . . . . . , Canandaigua Lake, T. Say" (No. 58732), showing that the form usually called *desidiosa* is not the one so called by Say. Prof. Edward S. Morse, who made the drawings for Binney's work, has been unable to give any information concerning the specimen figured by Binney.

Last summer the writer made three trips to Cayuga Lake, one to the south end at Ithaca and two to the north end at the town of Cayuga, with the hope of securing specimens which would correspond with Say's specimens. Three whole days were spent in exploring several miles of the shore and the small creeks, and while specimens of both *palustris* and *obrussa* were obtained, not a single specimen was found which agreed with Say's *desidiosa*. The *palustris* were the large, thin-shelled form and the *obrussa* were rather small specimens, not at all like the description or specimens of *desidiosa*. As Say gave no particular part of Cayuga Lake as the identical spot in which the types were collected, it renders the task of finding locotypes well nigh impossible, since the lake is 88 miles in length.

Recently, Miss Mary Walker, of Buffalo, New York, sent the writer a number of shells from Young's Quarry, Williamsville, New York, which are identical with Say's specimens of *desidiosa*, having the same number of whorls and almost the same measurements. These are given for comparison:

Say's specimens:

Length 15.00, breadth 7.50, aperture length 8.00, breadth 3.00 mill.

Length 14.25, breadth 7.50, aperture length 7.75, breadth 3.50 mill.

Miss Walker's specimens:

Length 15.00, breadth 8.00, aperture length 8.00, breadth 4.00 mill.

Length 14.00, breadth 8.00, aperture length 8.00, breadth 3.50 mill.

Say's figure in the American Conchology (plate 55, fig. 3) corresponds with the specimens from Williamsville, all having the peculiar obese body whorl. Say himself identifies *desidiosa* from western New York in Long's expedition, II, p. 263, where he says, "*Lymneus desidiosus* nob. Falls of Niagara."

The history of *desidiosa* in the American monographs is interesting and clearly indicates that since Say's time little attention has been given to closely analyzing this species. In all of his references Say distinctly indicates a shell of the *palustris* type.

Haldeman describes and figures the form now distinguished as *obrussa* and not the true *desidiosa* (compare his plate with Say's figure 3). Many of Haldeman's figures are abnormal and do not represent *obrussa* as it is usually developed. Tryon, in his continuation of Haldeman's work, (p. 104) states that many of the figures on this plate are not *desidiosa* but a form of *columella* (*macrostoma*). In this statement Tryon is wrong and could scarcely have seen Haldeman's specimens, for a recent examination proved them all to be referable to *obrussa* (*desidiosa* of authors) although as stated above several of the specimens are abnormal. The writer has collected many specimens similar to those figured on Haldeman's plate.

Binney, in his Land and Fresh-water Shells of North America, Part II, makes *obrussa* a synonym of *desidiosa*, thus showing that he considered the latter the small, smooth form and not the true *desidiosa* of Say and his figure 68 is questionable for the reason and is probably of a long-spired *obrussa*. In Baker's Mollusca of the Chicago Area *obrussa* is described and figured as *desidiosa*.

Recently Dr. W. H. Dall, in his Alaska Mollusks (p. 73, fig. 51) figures Say's *obrussa* under *desidiosa*, but also refers in his synonymy to Binney's figure 68. The European monographs have given figures referable to *obrussa* rather than to *desidiosa*.

Amidst the uncertainties caused by the absence of Say's types we must look for a shell which is closely allied to *elodes*, but is smaller, with more convex whorls, and possesses 5 instead of 6 full whorls. Such a shell is found in the autotypes of *desidiosa* in the Philadelphia Academy, and this type of shell occurs in several localities in the eastern part of the United States, and is easily separable from any other known species or variety. The spire varies considerably, being short, or long, or even scalariform. There are from 2 to 5 rest varices on the whorls.

Desidiosa, then, differs from *obrussa* (*desidiosa* of authors) in its generally larger and more solid shell, longer and more turreted spire, more pronounced and heavier sculpture and more convex whorls, with deeper sutures; in having an internal rib inside the outer lip and in the presence of a fold on the columella. Compared with *palustris*, *desidiosa* is smaller, usually more solid and with a more obese body whorl and a more dilated aperture. The spire, too, is more sharply conic and the whorls are more tightly coiled, producing a deeper suture. The inner lip is also more expanded, producing a heavier callus. The shells called *elodes* by Say are larger, more flat-sided, with a longer spire, and the whorls are not so rounded and are more oblique.

If we accept the evidence afforded by Say's specimens (and there seems to the writer to be no other course), then the shells usually called *desidiosa* must bear the name of *obrussa*, which is the first available name, and *desidiosa* must be used for the shells so-called by Say.

Explanation of Plate III.[1]

Fig. 1. *Lymnæa desidiosa* Say, Williamsville, Erie Co., N. Y. (from collection of Miss Mary Walker, Buffalo, N. Y.)

Fig. 2. Say's figures of *Lymnæa desidiosa* in Amer. Conch., pl. 55, fig. 3.

NORTHERN OPISTHOBRANCHIATA.

BY F. M. MACFARLAND.

Northern and Arctic Invertebrates in the Collection of the Swedish State Museum (Riksmuseum). III. Opisthobranchia and Pteropoda. By Nils Odhner (Kungl. Svenska Vetenskaps Akademiens Handlingar, Band 41, No. 4, pp. 1–118, pl. I–III, 1907).

The above work will be welcomed by American zoölogists as a valuable contribution to our knowledge not only of the Opisthobranch fauna of Scandinavian waters, but also as of great convenience in studying the quite similar fauna of our own North Atlantic shores. The classic *Index Molluscorum Scandinaviæ* of Lovén, 1846, and the *Mollusca Regionis Norvegiæ* of Sars, 1878, have been for

[1] Plate III will appear in the July number.

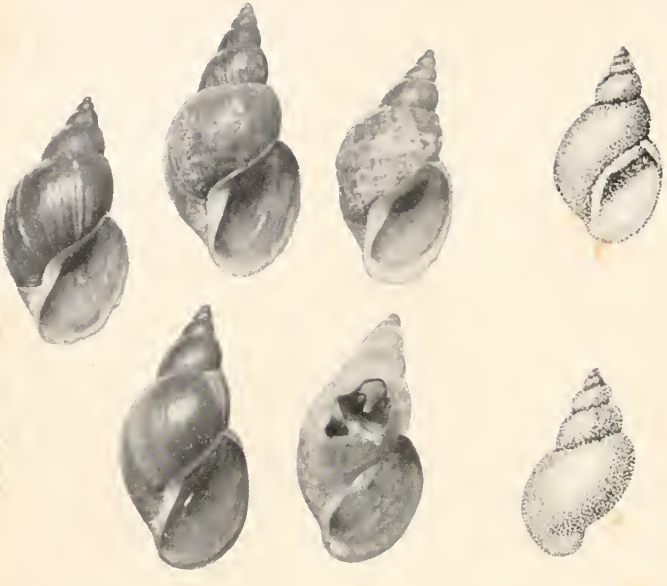
many years the principal extended sources of information upon this subject. The paper of Mr. Odhner is based upon the large collection of Northern and Arctic forms which the Swedish State Museum has accumulated from various expeditions and other sources since its foundation, and which have been studied in part only by scientists. The geographical area represented is a wide one, nearly completely circumpolar in its extent. It includes principally the Arctic Ocean off Siberia, the Kara and White Seas, the Arctic and Atlantic Oceans off the coast of Norway, the waters surrounding the whole Scandinavian peninsula, and to a less extent the coasts of Spitzbergen, Iceland and Greenland, the North Atlantic, Davis Strait, Baffin Bay and Bering Sea.

The first section of the paper gives a useful systematic synopsis of the Opisthobranchs and Pteropods studied, based largely upon the well-known works of Fischer, Bergh and Pelseneer. Following this is a detailed summary of the geographical and bathymetrical distribution.

The third section of the work is devoted to a description of the new forms found in the collection. These are *Diaphana hyalina* Turton var. *spirata*, *Diaphana glacialis*, *Goniæolis lobata*, *Archidoris nobilis* Lovén MS., *Issa villosa*, *Doridunculus pentabranchus*, *Idalia pulchella* A. & H. var. *fusca*, and *Cumanotus laticeps*, the last named being the type of a new genus of Aeolidiadae.

Of especial interest and value to students of this group of Mollusca are the three excellent plates, the second and third being especially welcome. These two present artistic reproductions in the natural colors of sixty-one figures of forty-one different species, prepared under the direction of Professor Lovén by the artists W. and F. v. Wright, but never yet published. These form a valuable supplement to Lovén's Index, the original numbers assigned by him being given in parentheses upon the plates. Those who have studied these beautiful animals in life and compared them with even the very best museum specimens, in which original color and body form have alike disappeared, will fully appreciate this preservation in a permanent manner of these important records.

The usefulness of the paper is further enhanced by a chronological bibliography and a very complete index. The convenience of the former might have been increased somewhat by the addition of abbreviated titles of all the papers cited, which are omitted in most cases, the date, author, journal and place alone being given.



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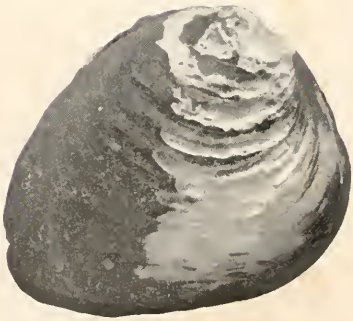

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1, 2. LYMNÆA DESIDIOSA SAY.
3, 4. PLEUROBEMA TOMBIGBEANUM FRIERSON.

The Nautilus.

Vol. XXII. JULY, 1908. No. 3.

ON EUCONULUS FULVUS AND E. TROCHIFORMIS.

BY HENRY A. PILSBRY.

Helix fulva as described by Müller (1774) was a composite of two species: (1) adult *Helix fulva* of Draparnaud and later authors, and (2) immature *Helix bidentata* Gmelin. Müller's idea exactly reversed the age-relations of the two forms; he considered (1) to be the young stage of (2), and while he described both forms satisfactorily, and gives the measurements of both, a fuller description is naturally given of the form he considered adult. The somewhat unusual conic shape, etc., rendered it easy for subsequent authors to recognize both forms from Müller's description. Indeed it would be hardly possible to mistake any other snail of the region for either.

The next notice of the forms was by Gmelin (1791), who admits Müller's *H. fulva* without recognizing its composite nature, his account being merely compiled from Müller. Gmelin moreover described and named the adult stage of *Helix bidentata*, referring to unmistakable figures in the *Conchylien Cabinet* of Chemnitz. There has never been any controversy about the validity of Gmelin's *H. bidentata*.

Ten years later (1801), Draparnaud, in his *Tableau des Moll. terr. et fluv. de la France*, p. 72, restricts *Helix fulva* to the *Euconulus*, giving an excellent description. He also recognized and described *H. bidentata*, the two being quite rightly placed in different groups. Up to the present time this arrangement has been followed almost universally.

Two years later, in 1803, Montagu described and figured *Helix trochiformis* (*Testacea Britannica*, p. 427). The account agrees well with our *Euconulus fulvus* except in the number of whorls, Montagu giving it six, which is one more than *E. fulvus* usually has. Montagu did not recognize Müller's snail in his new species. His knowledge of the work of continental authors seems to have been extremely restricted.

So far as I know, the name *trochiformis* has been adopted only by Beck, in his catalogue of 1837, and by Dall, 1905.[1] No description of the snail under Montagu's name has been published since the original one in 1803.

So much for the evidence from original documents. I am acutely aware that on any question of nomenclature there may be from two to a dozen opinions, each supported by arguments which to some will appear conclusive, yet in a case like this, where the conchologists of a century have been practically of one mind, a reversal of their judgment should not be made without full consideration of all aspects of the question. It might reasonably be argued that Müller's description, covering the adult stage of one species (*fulva* auct.) and the immature stage of another (*bidentata* Gmel.), should be restricted to the former, even though Müller himself mistook the real relations of the forms. It is hardly necessary to discuss the inexpediency of discarding all composite species, since everybody admits that either with species or genera some member of the original *melange* must conserve the original name unless all be synonymous with earlier names. It seems to me that the case may be summarized thus:

1774. Müller described as *H. fulva* a composite of two species (*Hygromia bidentata plus Euconulus fulvus* of modern authors).

1791. Gmelin eliminated *H. bidentata* from the composite by his unmistakable diagnosis and reference.

1801. Draparnaud recognized the composite nature of Müller's *H. fulva* and restricted that name to the *Euconulus*, which he well described and later figured.

I venture to submit the opinion that no action by Montagu or any other subsequent author should affect the status of either of the two species in question. *Euconulus fulvus* therefore should stand.

[1] Land and Fresh Water Mollusks of Alaska and adjoining regions, Harriman Alaska Expedition, Vol. xiii, p. 40.

DESCRIPTION OF A NEW PLEUROBEMA.

BY L. S. FRIERSON.

PLEUROBEMA TOMBIGBEANUM n. sp. Plate III, figs. 3, 4.

Shell short, triangular, thick, solid and heavy; truncated in front, roundly pointed behind at the post-base. Beaks high and incurved, their sculpture not seen. Post ridge rounded, and close to the post margin. The sides are slightly flattened just in front of the post-ridge, and an inflated, raised area extends from the beaks to the anterior base. This area is to a considerable degree concentrically sulcated, the sulci becoming obsolete behind, where it becomes striated; epidermis rayless, dark reddish brown or having faint greenish rays near the beaks. Lunule triangular, and membranaceous. The shell is markedly flattened in front, half way from beaks to base, showing a sort of so-called "secondary lunule." Nacre white, to rose color, and irideseent. Musele sears well impressed, and separate. Beak eavities shallow. In the left valve there are two low, thick eurved laterals, somewhat striate, and a stout, upright, bifid, striate, acuminate eardinal. In the right valve a single low, stout eurved lateral upon a very wide heavy plate, or shelf, and a single wedge-shaped eardinal arising from a pit surrounded by a semieircular, low ridge. Cardinal plate thick, on the inner surface of whieh may be noted the dorsal musele scars.

Length 48, alt. 40, diam. 32.3 mm.

Length 41, alt. 39, diam. 27.5 mm.

Tombigbee river. Types from Demopolis, Marengo Co., Alabama, in coll. Frierson and A. N. S. Phila. Also found at Columbus, Mississippi.

The shell may be mistaken by the casual observer, for a small *Quadrula pyramidata*, Lea, but may easily be distinguished by its smaller size, and especially its shallower beak eavities, lower beaks, and less pronouneed suleus from beak to post base. It seems a rather rare shell in the Tombigbee and Alabama Rivers. Four and a half speeimens were reeeived in three "envois" from the former river. Mr. Bryant Walker informs me that he has two specimens, from the Alabama River. One from the eolleetion of Dr. Lewis, and labeled by him "*U. plenus*," and the other reeeived

from Mr. R. E. Call, and placed among his "*pyramidata.*" Mr. William A. Marsh has examples, which have been labeled "southern variety of *pyramidata.*" Mr. Walker thinks the shell is however a *Pleurobema*, rather than a *Quadrula* and he places it in the scheme of classification next to *Pleurobema taitianum*, Lea. Compared with that species, ours is less convex, with a more or less distinct sulcus back of the convexity. Uniologists having southern *pyramidata*, may perhaps find specimens of *P. tombigbeanum* in the lots.

SOME NEW BRACHIOPODS.

BY WM. H. DALL.

During the researches of the U. S. S. Albatross party in 1906 a good many brachiopods were obtained, and the range of some known species much extended. The examination indicates that two species of those obtained are undescribed. Diagnoses are now given and figures are in preparation.

Terebratula (*Liothyris*) *sakhalinensis* n. sp.

Shell large, solid, of a rather dark and ruddy brown color and nearly smooth surface which bears faint concentric lines of growth and usually fainter, irregularly radial impressed lines on the anterior portion of the shell; valves moderately convex, the anterior margins slightly flexuous, the middle of the ventral valve is slightly squarely impressed and produced, the extension fitting into an analogous excavation in the dorsal valve; beak stout, moderately recurved, usually much eroded, with a large, entire foramen; the deltidial plates form a solid arch with no mesial groove; internally a thickened collar or short tube surrounds the peduncle, and an evident, but not prominent, short septum extends mesially about 2 mm. from the collar forward, in one specimen. Hinge of the ventral valve solid, with no props to the dental processes; in this valve the pallial sinuses exhibit two strong parallel trunks which extend nearly to the anterior margin before they begin to bifurcate; the genital glands extend as a fine, brown, irregular reticulation over the main cavity of the sinuses outside the inner line of the respective trunks on either side; dorsal (or hæmal) valve with a small but evident cardinal

process; the dental processes small and narrow; the loop is peculiar, the two supporting arms are appressed and soldered to the wall of the valve for a distance of 8 or 9 mm., so that the loop appears to spring from the valve and not from the hinge; it abruptly bends upward at a point about 12 mm. in front of the beak, forming a very wide, slender, frail, almost flattened loop with short triangular crura; the width of the loop is about 12.5 mm., the height of its arch about 3 mm., while the crura, which are curved inward parallel with the limb of the arch, are about 3 mm. long. A mesial septum, low and narrow but distinct, extends forward as far as the anterior edge of the adductor scars; the pallial margin carries minute setæ, which do not project beyond the edge of the valve. Length of ventral valve 45, breadth 34.5, max. diam. of shell 26 mm.

Dredged on the southeast coast of Sakhalin Island, Okhotsk Sea, in 64 to 100 fathoms, bottom temperature 30° F. Type, U. S. N. Mus., 110, 786.

The remarkable loop of this species is sufficient to distinguish it from any other of the genus; the characters mentioned are found in all the specimens.

Laqueus morsei n. sp.

Shell thin, smooth, polished, ruddy brown, rounded lozenge-shaped, somewhat attenuated in front up to a 10 mm. wide truncation; ventral valve with a short beak, entire foramen and short, wide, flattened area; deltidial plates united, but showing a groove at the junction; dental processes short, triangular, strong, supported by strong props with deep funnel-shaped cavities behind them; pallial sinuses with two inner trunks bifurcating at the anterior third of the valve, and two outer ones branched on the outer side from the beginning; genital glands in two longitudinal lines on each side extending along the middle of the main trunks of the sinuses and barely distally bifurcated; dorsal valve with a small but well developed hinge-plate, but no cardinal process or cavities under the dental processes; the septum is short and delicate; the loop normally formed but extremely slender, except the bight of the recurved portion, which is much wider than the rest; the valves meet in a nearly uniform plane, an extremely faint indication of a truncation in front forms the only approach to a flexuosity. Length of ventral valve 32.5, of dorsal valve 29.0, breadth 30.5, diameter of shell 18.0 mm.

Dredged at station 4,860 in the Japan Sea, in 122 fathoms, mud and stones, bottom temperature 34° 1 F. U. S. N. Mus. 210,800.

The species is named in honor of Prof. E. S. Morse of Salem, whose work on the brachiopods is well known. The most nearly related species is *Laqueus mariæ*, A. Adams, which is more ovate, with a narrower and more recurved beak, the genital glands differently distributed, and the mesial septum of the dorsal valve, long, high, and prominent; reaching to the anterior fourth of the valve, while in *L. morsei* it barely reaches the middle of the valve.

A white variety (*albida*) of *Waldheimia* (= *Eudesia*) *raphaelis* Dall, was also dredged, the specimens being more compressed laterally and with sharper anterior flexures than in the type. A dwarf form of the same species with all the characteristics of the adult, except that it measures 17 mm. long instead of 37, was dredged in Kagoshima Gulf. The normal adults of the species show little or no flexuosity anteriorly, until nearly full grown, but the dwarf referred to possessed them in perfection.

A NOTE ON HELIX HORTENSIS.

BY OLOF O. NYLANDER.

I have been much interested in your articles on *Helix hortensis* in America. When a small boy they were among my choicest playthings and I gathered large numbers of them together with *H. nemoralis* in south-eastern Sweden.

In 1899 among a lot of marine shells collected at Grand Manan, and given to me for identification were three land shells. One specimen had five narrow, dark brown bands on a light yellow ground, a common form of *Helix hortensis;* both were of larger size than any specimens in my collection from Sweden, Germany and England. One specimen is of a rich yellow color, comparing in every way with European specimens in my collection. The third specimen was a young shell, light yellow in color and like the plain-colored *Helix hortensis* of the Maine coast. Mrs. S. Page who collected the specimens, informed me that they were plentiful on the Island of Grand Manan, her native home. As there is so much

speculation relative to the origin and distribution of *Helix hortensis*, in America, I will state that in my opinion they were introduced by the early French settlers in Canada, at Gaspé and along the St. Lawrence River; and that their distribution only along the coast is due to the more favorable conditions. The long cold winters—sometimes commencing in September and lasting into the middle of May in Canada and Maine, are too severe and long for *Helix hortensis* to spread over the interior. Along the coast, and on the islands, the winters are not as long or as intensely cold as in the interior. I have gone over a very large part of northern Maine and a good part of New Brunswick and have never seen *H. hortensis*.

I have collected *Helix hortensis* at Hörte and Sherlotenlund on the south coast of Sweden within a few steps of the water edge of the Baltic Sea.

A NEW WEST INDIAN NITIDELLA.

BY WM. H. DALL.

During a recent visit to Cuba Mr. John B. Henderson, Jr., collected a few marine shells from the rocks along shore, between tides, at Ensenada de Cochinas, on the south side of the island. Among them was the following species which I have been unable to identify among the described forms of the genus.

Nitidella hendersoni n. sp.

Shell thin, fusiform, with an elongate, very acute spire, and about eight whorls; nucleus minute, white, smooth; subsequent whorls flattish with an appressed suture, pinkish near the nucleus, later becoming translucent with dark chestnut-brown lineolations, zigzags or dots, frequently with white, protractive, oblique flammulations at the suture of which the anterior margins are bordered with a dark chestnut line; also on the periphery is often a narrow articulated band, of white and brown spots; the surface is covered with a conspicuous greenish periostracum, which on the body whorl is elevated in axial lamellæ not close enough to give a velvety effect but separated by wider polished spaces; surface nearly smooth under the periostracum, polished, with faint indications of fine axial or revolving striæ; on the base there are numerous spiral grooves which

become stronger and channeled near the end of the nearly straight canal; aperture white, within purplish; outer slightly thickened, not reflected, smooth within; posterior angle of the aperture grooved and produced a little, with a subsutural obscure callosity on the body which elsewhere has the surface smoothly erased, edge of the pillar with one faint and one very strong marginal fold; operculum normal. Alt. of shell 19, of last whorl 13.5, of aperture 10, max. diam. 8.0 mm. Found in crevices of the rocks a little below low-water mark.

MOLLUSCA OF KEENE, NEW HAMPSHIRE.

BY R. D. WALKER AND WM. H. COOLIDGE, JR.

The shells that comprise this list were found in Keene, N. H., by the late George Alexander Wheelock, and form a small part of the extensive general collections which he made. The list is perhaps worth publishing as local data in regard to the shells of Keene and the surrounding regions. Mr. Wheelock spent almost his entire life in Keene (1816–1906) investigating the natural history of Monadnock. The determination of the species is through the kindness of Mr. Charles W. Johnson.

Planorbis parvus Say.
Planorbis bicarinatus Say.
Planorbis campanulatus Say.
Segmentina armigera Say.
Lymnea humilis Say.
Physa heterostropha Say.
Aplexa hypnorum.
Succinea ovalis Say.
Polygyra albolabris Say.
Polygyra fraterna Say.
Zonitoides arboreus Say.
Pyramidula cronkhitei anthonyi Pils.
Lyogyrus granum Say.
Amnicola limosa Say.
Unio complanatus Sol.
Alasmodonta undulata Say.
Lampsilis nasutus Say.
Anodonta cataracta Say.
Sphaerium rhomboideum Say.
Sphaerium secure Prime.
Sphaerium partumeium Say.
Sphaerium simile Say.
Pisidium variabile Prime.
Pisidium compressum Prime.

These specimens are in the Thoreau Museum of Natural History, Middlesex School, Concord, Massachusetts.

NOTES.

THE VERRILL COLLECTION.—Prof. A. E. Verrill of Yale University has sold to the University his great collection of marine invertebrates, acquired during his work for the United States Fish Commission in the 16 years from 1873 to 1887. The collection is the duplicate of one secured at the same time and since transferred to the National Museum of the Smithsonian Institution at Washington.

FORMATION OF EPIPHRAGM BY LYMNÆA PALUSTRIS (Müller). —A few days ago while collecting fresh-water shells in the dry bed of a pond near Alum Rock Park, San José, the author found several live specimens of a form of *Lymnæa palustris* Müller lying on the dry mud surface with the aperture sealed down by thick dried mucous and withdrawn into their shells half a whorl. The pond usually contains water at least half the year but on account of the dry spring has contained none since April 1st at least. The bed is thinly covered with tall tulas so that the shells were not in the direct rays of the sun. This form is the only one which occurs in the lake and dead shells up to barely mature are abundant, and some larger. —HAROLD HANNIBAL, San Jose, Cal.

EXOTIC VIVIPARA IN CALIFORNIA.—Amongst the fresh-water molluscan fauna of the "Artesian Belt," between San José and San Francisco Bay, is a large operculate edible snail introduced by the Chinese fifteen or twenty years ago. 4 mm. when born, carinate till mature, 6 months 20 mm. Occasionally in sub-brackish water, grows as large as a duck's egg. Plain yellow-green or with spiral fringes of epidermis.

Specimens were sent to Dr. Dall, who identified it as *Vivipara lecythoides* Bens.

It is very common where planted, but spreads slowly.

In the NAUTILUS XV, p. 91, is a reference to *Vivapara stelmaphora* Bgt., from a dry bed of a lake or pond "at the foot of Mt. Hamilton." The author has been over the San José, Mt. Hamilton road collecting, and of the four lakes and ponds on the route only one, on the Grant ranch in Hall's Valley, appears to answer the description, as it had been dry at the time that article was written for

several years. The fauna was exactly the same as in the neighboring parts of Santa Clara Valley, except extremely large, and contained not a sign of an operculate snail of any kind, nor did the son of a neighboring rancher know of any such form, though he knew the other species by sight. The other ponds were no better. Either the locality given was incorrect or the species was killed out by the drying-up of the lake while the other forms were not for some reason. Certainly it does not occur there at present for no traces could be found.—Harold Hannibal, San José, Cal.

PUBLICATIONS RECEIVED.

A New Species of Cavolinia, with Notes on Other Pteropods. By Wm. H. Dall (Smithsonian Misc. Coll., Vol. 50, Jan., 1908). *Cavolinia couthouyi*, n. sp., from Fiji Is. and New South Wales.

Gonidea angulata Lea, with Description of a New Variety. By Wm. H. Dall (Smiths. Misc. Coll., Vol. 50, Jan., 1908). *G. a. haroldiana* is a new form from Guadalupe Creek, between San José and San Francisco Bay, "remarkable for the almost total absence of lateral angulation," etc.

Notes on the Fresh-water Mollusk Planorbis magnificus and Descriptions of Two New Forms. By Paul Bartsch (Proc. U. S. Nat. Mus., Vol. 33, pp. 697–700). *Planorbis magnificus* Pilsbry occurs in Greenfield Pond, near Wilmington, N. C., where it is rather scarce and local. *P. eucosmius*, n. sp., was found in the same pond. It is very close to *P. bicarinatus striatus*, but distinguished by having two chestnut bands. *P. eucosmius vaughani*, n. subsp., is from Burke's Place, La. All are illustrated with photographic figures.

The Physiology of the Nervous System of the Razor-shell Clam, Ensis directus Conrad. By Gilman A. Drew (Journal of Experimental Zoölogy, V, No. 3, March, 1908). Among other interesting conclusions, Dr. Drew finds that "the

pedal ganglia are apparently dependent upon the cerebral for initiative." When isolated, stimulation causes only local responses. Impulses may pass in both directions through any of the commissures and connectives. Impulses may be sent by roundabout connections when the usual connections are destroyed.

First Additional Catalogue of Land Shells of Japan. By Y. Hirase, Kyoto, 1908. In this list of 24 pages Mr. Hirase catalogues the species and varieties from Japan, the Bonin and Loochoo Islands and Formosa, obtained since the publication of his former list. It is interesting as showing the results of the latest work on these wonderfully rich faunas. Copies of the catalogue will be sent free, we believe, to those interested in the collection of Japanese shells. A handsome plate illustrates various new or interesting species.

Zoological Record, Vol, xliii, pt. viii, Mollusca.—By E. R. Sykes, completed by S. Pace and R. M. Pace. This complete record of all that has been published on Mollusca for the year 1906 together with every generic and specific name used, is indispensable to all working conchologists. The part containing 103 pages can be obtained for 4 shillings of Harrison & Sons, 45 St. Martin's Lane, London, Eng.

The Williams Collection of Shells.—By George Halcott Chadwick, Chicago, Ill., 1908. A brief account of the conchological cabinet of Mrs. Alice L. Williams, which contains so many rare and beautiful shells. It is undoubtedly the finest private collection in America. The collection contains 26,000 shells, "a number unexceeded, I believe, by any private shell cabinet in America since the day of John Jay. While the collection is rich in species representing almost every family, one naturally turns to those gems of the sea, the Cypræidæ. Here we find *Cypræa broderipi*, the only one in America, *C. nivosa*, *castanea*, *chrysalis*, *coxeni*, *crossei*, *similis*, etc., etc., while species considered by many rare are represented by series to show variation. There are 10 *C. aurantia*, 10 *decipiens*, 10 *thersites*, 7 *scotti*, 4 *umbilicata*, etc. Among the Conidæ is enthroned *Conus gloria-maris* while the rare

cervus is also there. The beautiful Volutidæ are represented by many species one scarcely sees in a lifetime. *Pleurotomaria beyrichii* is also among the treasures, but space will not permit us to go into details. It has been admirably described by Mr. Chadwick, who says: "My desire in this writing is to make this remarkable collection better known. It has been a labor of love, and I can wish for those who read no greater pleasure than to come under the fascinating spell of this great collection. It deserves a place in some great hall of science, and it is Mrs. Williams's hope that it may some day be thus installed through public or private munificence."

Descriptions of new species of mullusks from the Pacific Coast of the United States, with notes on the other mollusks from the same region. By William Healey Dall (Proc. U. S. Nat. Mus. vol. 34, pp. 245–257. Numerous new species and subspecies chiefly discovered by Dr. R. H. Tremper, Messrs. Herbert W. Lowe, F. W. Kelsey, and the U. S. Bureau of Fisheries, are described, with notes on previously known forms.

Smell the dominant sense in Diabrotica 12-punctata and Limax maximus. By Robert E. C. Stearns. (Proc. Biol. Soc. Washington xxi, pp. 137–140). *Limax* is guided to its food by smell. Salt liberally strewed on the floor is recommended as a check to their depredations.

On the synonymic history of the genera Clava Martyn and Cerithium Bruguiere. By W. H. Dall. (Proc. Acad. Nat. Sci. Phila. 1907, pp. 363–369). The history of these old names is fully exposed and various errors in matters of fact in M. Cossmann's review of the Cerithiacea are pointed out.

New and characteristic species of fossil mollusks from the oil-bearing tertiary formations of Santa Barbara Co., Cal. By Ralph Arnold. (Smith's Misc. Coll. vol. 50, pt. 4. 1907). Numerous interesting fossils from Eocene, Miocene and Pliocene horizons are described and well illustrated. Among them are *Venericardia planicosta* Lam., from Little Falls, Washington, "the most widespread and characteristic eocene species in the world," *Lymnæa alamosensis* n. sp., from the pliocene of Los Alamos Valley.

The Nautilus.

Vol. XXII. AUGUST-SEPTEMBER, 1908. No. 4-5.

MISCELLANEOUS NOTES ON CALIFORNIAN MOLLUSKS.

BY S. S. BERRY.

A specimen of *Cypræa spadicea* Gray has recently been brought to the writer's notice by Mrs. C. H. Fackenthall, of Pacific Grove, who some years ago found it alive on Chinatown Point, Monterey Bay. This extends the known range of the species many score of miles beyond the most northern locality which has previously been recorded.

Mrs. Fackenthall also collected in March, 1907, over sixty specimens of *Ianthina exigua* Lam. where they had been washed ashore near Point Pinos. This is a new locality for this species likewise.

Another *Ianthina*, which is apparently the *I. globosa* of Swainson, and is new to the Californian fauna, was found in considerable numbers at Oceanside, San Diego county, by Mrs. T. E. N. Eaton and Miss Grace Eaton in the summer of 1906. This species was found in company with *I. exigua* and another undetermined form of the same genus (*I. communis*?) cast up on the sandy beach, and for the most part still retained the animals.

* * * * * * *

In July, 1903, the writer made a small collection of fossils from the pleistocene deposit which forms the cliff just west of the bath-house at Santa Barbara, among which many of the species are of interest because not included by Arnold in his lists [1] of the mollusks of the Santa Barbara pleistocene. Such species are marked with an asterisk. One or two forms are likewise entirely new to the formation.

[1] Paleontology and Stratigraphy of San Pedro, p. 52 q. v.

Margarita pupilla Gld. Several.
* Margarita optabilis knechti, Arnold. One specimen.
* Calliostoma canaliculatum Mart. Several juv.
Leptothyra bacula Cpr. Not rare.
* Leptothyra carpenteri Pils. Not rare.
Leptothyra paucicostata Dall. Not rare.
* Acmaea mitra Esch. Two juv.
* Acmaea (sp.). One juv.
Natica clausa B. and S. Young specimen and opercula.
Crepidula navicelloides Nutt. One specimen.
Crepidula adunca Sby. Two examples.
Rissoa acutilirata Cpr. Two specimens.
*Rissoa (sp ?). One example.
*Diala marmorea Cpr. Several.
Lacuna compacta Cpr. The most abundant form.
Bittium asperum Gabb. Common.
Bittium (quadrifilatum Cpr.?). Common.
Bittium (sp.). Common.
*Epitonium (Opalia) borealis Gld. One specimen.
Ocinebra perita Hds. Several.
*Ocinebra interfossa Cpr. One specimen.
*Ocinebra lurida Midd. *var.* tending toward Carpenter's *var.* munda. Several.
*Ocinebra (sp.). One specimen.
Boreotrophon gracilis Perry. One example.
*Boreotrophon stuarti Smith. One example.
*Boreotrophon stuarti praecursor Arnold. Several.
Amphissa corrugata Rve. Common.
Columbella tuberosa Cpr. Common.
*Nassa mendica cooperi Fbs. One example.
Fusus robustus Trask ? One example.
Fusus (sp.). Several.
*Mitramorpha filosa intermedia Arnold.
[*Note:* This form was likewise found in a living condition by the writer at Pacific Grove, Cal., in April, 1908.]
Clathurella conradiana Gabb. Two specimens.
*Tornatina cerealis Gld. Two examples.
*Dentalium indianorum Cpr. One perfect adult specimen.
*Psephidea (ovalis Dall ?). One valve.

Venericardia ventricosa Gld. Abundant.

Pecten jordani Arnold. Fragments and two juv.

Pecten caurinus Gld. Fragments.

Pecten (sp.). Fragments.

Pecten hastatus Sby. Several valves.

*Monia macroschisma Desh. One valve.

*Glycymeris barbarensis Conr. One valve.

Strongylocentrotus purpuratus Stimp. Fragments of the test and loose spines of this sea-urchin.

*Platidea anomioides Scacch. One perfect shell probably referable to this species was found which agrees well with specimens from San Pedro Bay (200 fathoms), except that the foramen is relatively smaller and the posterior and anterior angles are more acute.

* * * * * * *

In the Proceedings of the U. S. National Museum, Vol. XXX, Messrs. Dall and Bartsch propose the specific name *montereyensis* for the preoccupied *Turbonilla gracillima* of Gabb. The authors must have overlooked the fact that Dr. Cooper in his Monterey list published in the American Journal of Conchology for 1870 likewise noticed the untenability of Gabb's name and rechristened the species *Chemnitzia gabbiana*, so that this name having priority must stand as *Turbonilla* (*Chemnitzia*?) *gabbiana* (J. G. C.).

* * * * * * *

Nassa perpinguis, var. *bifasciata*, *nov.* Among the mollusca collected recently at San Pedro by various collectors has been a color form of *Nassa perpinguis* Hds., which is strikingly distinct and is certainly worthy of a varietal name if color forms must be named. It differs from the ordinary form in the presence of two broad spiral bands of a deep chestnut color in abrupt contrast to the grayish-buff ground color of the shell. One of these bands is situated just below the suture, one about the periphery, and occasionally a fainter band makes it appearance at the extreme base of the last whorl. The bands vary considerably in width, but as yet I have seen no specimens having but a single band.

Additional Notes on Monterey Mollusks.

In my paper on the Molluscan Fauna of Monterey Bay, California, which appeared in the numbers of this magazine running from June to September, 1907, there were a few unavoidable errors and omis-

sions which may well be remedied. The following corrections should be made:

June No., p. 18, near top. *304* species were listed; not *394*.

P. 18, near bottom of page. "*Terebratulina*" *transversa* is a misprint for "*Terebratalia.*"

P. 19. The identification of *Barbatia gradata* is a very doubtful one and the species should probably be removed from the list.

July No., p. 35. "*Cregires*" *albopunctatus* should be *Aegires.*

Aug. No., p. 43. *Odostomia* (*Ividea*) *navisa* should be changed to *O.* (*Ividia*) *navisa delmontensis*, Dall & Bartsch. New subsp.

P. 43. "*Triforis adversus*" is not this species but an undetermined form.

P. 43. "*Seila assimilata* C. B. Adams" was identified according to the common misconception of that tropical species. My specimens should be listed as "*Seila montereyensis* Bartsch," n. sp. One of the co-types came from this lot.

P. 44. "*Rissoina*" *purpurea* is a *Rissoa.*

Sept. No., p. 52, near end of article. Should read as follows: ". . . of Scala (*nine* species), and of the Pyramidellidae (*eighteen* species)," etc. This last figure includes the additional forms enumerated below.

The following species and varieties have been determined from the same lot of material since the publication of the main report:

Adula stylina Carpenter. 12 fathoms; not rare with the other borers in the hard mud.

Cadulus quadrifissatus Carpenter. 12 fms.; one specimen.

Actaeon punctocaelatus Carpenter. 12 fms.; young specimens only.

Epiphragmophora sequoicola J. G. Cooper. Big Trees Station, near Santa Cruz; one immature specimen.

Epiphragmophora arrosa Gould. Big Trees Station, near Santa Cruz; several examples.

Epiphragmophora exarata Pfeiffer. Near Santa Cruz. Specimens were also seen from various localities in the Santa Cruz mountains and from Watsonville.

Epiphragmophora californiensis nickliniana Lea. Big Trees Station, near Santa Cruz.

Polygyra columbiana Lea. Big Trees Station, near Santa Cruz.

Polygyra columbiana armigera Ancey. One specimen found a few miles south of Pacific Grove in the pine woods.

Murex (*Ocinebra*) *interfossus* var. *muricatus* Cpr. Pacific Grove; not rare at low tide.

Turbonilla (*Turbonilla*) *gilli delmontensis* Dall and Bartsch. 12 fathoms; the type lot.

Turbonilla (*Strioturbonilla*) *stylina* Carpenter. 12 fathoms; one specimen.

Turbonilla (*Pyrgolampros*) *berryi* Dall and Bartsch. Two or three specimens, including the type, dredged in 39 fathoms.

Turbonilla (*Pyrgiscus*) *canfieldi* Dall and Bartsch. 12 fms.; the type lot.

Turbonilla (*Pyrgiscus*) *morchi* Dall and Bartsch.? One specimen dredged in 29 fathoms was doubtfully referred by Messrs. Dall and Bartsch to this species.

Cancellaria crawfordiana Dall. Specimens brought in by the fishermen.

The foregoing bring the total collection, after due corrections, up to about 318 named species and varieties, including types or co-types of fourteen new species and two subspecies, besides nine other species not previously described, but the types of which were collected elsewhere.

LAND SHELLS OF THE OKI ISLANDS, JAPAN.

BY H. A. PILSBRY AND Y. HIRASE.

The Oki Islands, in the Sea of Japan north of western Hondo, consist of one large and three smaller islands and several islets, the the whole group about 23 miles long. Saigō is the chief harbor. It is on the southeast side of the largest island, which has a diameter of about 10 miles. The highest elevation is said to be about 1700 feet.

The mollusks of Oki have not before been noticed.

Out of 24 species of land shells there are 9 forms which have as yet been found only on the Oki Islands. Two of these forms are reckoned to be of specific value; the other seven are subspecies of forms found on the adjacent portions of the Main Island of Japan, or in one case on Tsushima, though the two Ganesellas are so distinct that they might with some reason be ranked as species. All of the other forms occur on the Main Island of Japan.

The very close relation of the fauna of the Oki Islands with that

of the adjacent Main Island places these islands in harmony with Sado, Tsushima, Iki, and other islands in the Sea of Japan and Korea Strait, all of which have faunas which show them to have been joined at no remote period to the large islands of Japan.

In the following list, the forms peculiar to Oki are marked with an asterisk (*).

CYCLOPHORIDÆ.

Alycæus melanopoma Pils. (?). Nakamura.

Diplommatina cassa Pils. var. Saigō.

* *D. okiensis* Pils. & Hir. Nakamura. A subspecies of this snail, *D. o. tsushimana*, occurs on Tsushima.

HELICIDÆ.

Eulota (*Euhadra*) *peliomphala* (Pfr.) var. Nakamura.

Eulota (*Euhadra*) *senckenbergiana* (Kob.) var. Nakamura.

Eulota (*Euhadra*) *callizona minor* Gude. Nakamura.

Eulota (*Plectotropis*) *æmula* Gude. Nakamura.

* *Trishoplita cretacea pergranosa* Pils. & Hir. Nishinoshima.

Trishoplita endo Pils. & Hir. Nakanoshima.

* *Ganesella ferruginea okiensis* P. & H. Nakamura.

* *Ganesella myomphala euomphala* P. & H. Nakamura and Chiburijima.

Chloritis tosanus okiensis P. & H. Nakamura.

CLAUSILIIDÆ.

Clausilia (*Hemiphædusa*) *harimensis* Pils. Nakamura.

Clausilia japonica vespertina Pils. Nishinoshima.

Clausilia japonica ultima Pils. Nakamura.

Clausilia nishinoshimana Pils. Nishinoshima.

ZONITIDÆ.

Macrochlamys subelimatus P. & H. Nakamura and Daimanji-yama.

Microcystina vaga P. & H. Nakamura.

Microcystina ceratodes (Gude). Nakamura.

Kaliella ruida Pils. var. Nakamura.

Kaliella fraterna Pils. Nakamura.

* *Kaliella okiensis* Pils & Hir. Nakamura.

ENIDÆ.

Ena reiniana (Kob.) var., shaped like *ugoensis*. Nishinoshima.

AURICULIDÆ.

Carychium nipponense Pils. Saigō.

The descriptions of new species and subspecies follow:

Diplommatina okiensis n. sp.

The lower half of the shell, comprising two whorls, is cylindric, the upper half tapering in a rather long cone with straight sides. Adult shells are generally red-brown, rarely whitish, but the young are nearly white. There are nearly 7 moderately convex whorls, the penultimate, seen from the back, being the largest. The last whorl ascends in front, and has a strong, rather sharp ridge or collar a short distance behind the peristome, and preceded by a rather wide opaque whitish streak. The constriction is slight and median in front. The whole shell, after the smooth apex, has a sculpture of very fine, delicate, oblique, moderately close thread-striæ. The aperture is nearly circular, the parietal callus having a slightly thickened edge, reaching up nearly to the suture. Peristome well reflexed, usually very slightly angular at the foot of the columella. Palatal plica very short, half covered by the parietal callus. Columellar tooth moderately strong, deeply placed, thin but rather high within. Internal parietal lamella strongly developed.

Length 4, diam. 2 mm.

Nakamura, Oki. Types no. 95663 A. N. S. P., from no. 296 *c* of Mr. Hirase's collection.

This species differs from *D. paxillus* (Gredler) by its strongly developed collar. It is closely related to the common Japanese *D. collarifera* Schm. & Bttg., but that species has a much longer palatal plica, a decidedly thicker and stronger columellar lamella inside, and only a weak internal parietal lamella.

Trishoplita cretacea pergranosa n. subsp.

The shell is depressed-conic with obtusely subangular periphery, thin, whitish corneous, with a broad brown band on the base, extending from just below the periphery nearly to the umbilicus, and a narrow brown band above the periphery, ascending the spire above the suture. The surface has a minute sculpture of fine, somewhat waved or irregular striæ, which are minutely and very elegantly granulose; no distinct spiral lines.

Alt. 8.3, diam. 13.3 mm.; whorls $5\frac{1}{2}$.

Nishinoshima, Oki. Types no. 95840 A. N. S. P., from no. 1575 of Mr. Hirase's collection.

This snail, of which only 7 examples were taken, is most nearly related to *T. c. bipartita* of Nagato province, which is less depressed,

less angular, and has no band above the periphery. The minute and very beautiful granulation is somewhat variable.

Ganesella myomphala euomphala n. subsp.

The shell is more depressed than *myomphala*, with the umbilicus open, though partially arched over by the dilated columellar lip, which, however, is not in the least impressed in the axial region. The form is much less depressed than *G. m. omphalodes.*

Alt. 24, diam. 36 mm.; whorls $6\frac{1}{2}$.

Alt. 23.5, diam. 35 mm.; whorls $6\frac{1}{2}$.

Alt. 22.5, diam. 31 mm.; whorls $6\frac{1}{2}$.

Nakamura, Oki. Cotypes No. 95835, A. N. S. P., from No. 1560 of Mr. Hirase's collection.

A smaller form of this subspecies was taken in small numbers (10 individuals) on Chiburijima, Oki. Two measure:

Alt. 18.2, diam. 24.5 mm.; whorls 6.

Alt. 17, diam. 23 mm.; whorls 6.

Ganesella ferruginea okiensis n. subsp.

The shell is much elevated, bullet-shaped, the outlines of the spire strongly convex; narrowly, obliquely umbilicate; rich chestnut-brown, encircled with a narrow yellow band at the periphery and ascending the spire above the suture; surface nearly lusterless, rather weakly marked with growth-wrinkles and minute spiral lines, some intermediate whorls of the spire punctate or subpapillose. Whorls convex, the last rounded periferally, convex beneath. Aperture very oblique, the upper and columellar margins subparallel; baso-columellar margin straightened, thickened within, the edge reflexed.

Alt. 19.5, diam. 17 mm.; whorls $6\frac{1}{3}$.

Alt. 17, diam. 16.2 mm.; whorls $6\frac{1}{4}$.

Alt. 17, diam. 15.5 mm.; whorls $6\frac{1}{3}$.

Nakamura, Oki. Types No. 95820, A. N. S. P., from No. 1564 of Mr. Hirase's collection.

This form is well distinguished by its high contour. It may prove to be specifically distinct, but for the present we prefer to attach it to the widely distributed *G. ferruginea* of the main island.

Chloritis tosanus okiensis, n. subsp.

Umbilicus wider than in *C. tosanus*, contained six times in the diameter of the shell. Hairs of the surface not so close.

Alt. 8.8, diam. 16.8, width of umbilicus 2.8 mm.

Nakamura, Oki. Types No. 95821, A. N. S. P., from No. 1567 of Mr. Hirase's collection.

Kaliella okiensis, n. sp.

The shell is perforate, conic, amber-colored, glossy, the spire conic with slightly convex outlines, perifery thread-carinate, the base convex. The surface is smoothish, above, with faint growth-lines, and minute radial striæ just below the suture on the intermediate whorls; the base having faint spirals, not close together. Whorls 6, convex, slowly increasing, the last having a narrow, thread-like periferal keel. Aperture semilunar, rather narrow, the peristome rather broadly dilated near the axial insertion.

Alt. 2.7, diam. 3.6, mm.

Nakamura, Oki. Types No. 95849 A. N. S. P., from No. 1568 of Mr. Hirase's collection. Also No. 1569.

This species stands near *K. sororcula*, but it differs in having the whorls crenulated below the suture on the spire.

A NEW AMERICAN PLANORBIS.

BY FRANK COLLINS BAKER.

PLANORBIS BICARINATUS PORTAGENSIS n. var.

Shell with the dorsal and ventral sides sharply carinated, the spire and umbilicus typically forming deep, cone-like depressions; sculpture of strong growth-lines and distinct spiral lines, as in *bicarinatus striatus;* aperture strongly auriculate, the upper and lower extremities forming a strikingly developed V-shape.

Height 8.00, breadth 14.00; aperture height 10.00, breadth 5.50 mm.

Height 8.00, breadth 13.00; aperture height 9.00, breadth 5.00 mm.

Habitat: Portage Lake, on Fish River, Aroostook County, Maine. (Collected by O. O. Nylander; types in collection of Chicago Academy of Sciences.)

This peculiar variety may be known by the strong keels on the shoulder and base and by the V shaped upper and lower margins of the aperture, which produce a notably auriculate aspect. It was at first thought to be a form of Walker's variety *major*, but a comparison with specimens of the latter received from the author shows that the two are distinct varieties.

LAND SHELLS OF TANGULANDANG (TAGOLANDA.)

BY H. A. PILSBRY.

Tagolanda or Tangulandang is a small island between Celebes and Mindanao, about fifty miles from the N. E. extremity of the former, and between that and Sangi (Sangir). So far as I know, nothing has been known of its mollusks. A collector for Mr. Walter F. Webb, of Rochester, N. Y., took a number of land shells there, which show that the fauna has relations with both Celebes and Sangi. The list follows.

Cyclotus politus Sowerby.

Found also in Celebes, Flores, Timor and some other islands of the same region, but not north of Tagolanda.

Leptopoma tagolandense n. sp. Pl. IV, figs. 1, 2.

A species of the group of *L. manadense*. The shell is narrowly umbilicate, acutely carinate, slightly wider than high; typically corneous-whitish densely speckled with brown and encircled with a dark chestnut band below the periphery, but sometimes wanting this band. The brown spots are larger and rather regularly spaced just above the periphery and below the suture; the first three whorls are uniform yellowish-corneous or brown. Whorls 5½, all rather strongly convex, the last having an acute, projecting periferal keel, below which it is moderately convex. The first half-whorl is smooth; then 5 to 7 fine spiral threads begin. On the fourth whorl interstitial spiral striæ appear, continuing to the end, the primary spirals retaining their prominence as subequally spaced cords among the fine spiral striæ of the later whorls. The base is finely striate the striæ slightly unequal. Aperture oblique, sub-circular; lip white, not continuous, the upper margin expanded, basal margin reflexed; columellar circular dilated. Alt. 14, diam. 15 mm.; width of aperture 8 mm.

This species differs from *L. menadense* in sculpture. It stands near *L. vexillum*, well figured by the Sarasins, but the last whorl is more convex above than below the keel (whereas *vexillum* is more convex below), and there are fewer major spiral cords, 5 to 7 on the upper surface of the last whorl, while *vexillum* has 10.

There is also a form without brown markings, the shell bluish-white, yellowish-white at the spire. This may be called var. *immaculata*. Some individuals have a dark chestnut band below the keel.

Obba marginata (Müll.).

Elsewhere found widely distributed in the Philippines. The var. *sororcula* Marts. in Celebes.

Helicostyla leucophthalma tagolandensis n. subsp. Pl. IV, figs. 5, 6, 7.

Shell smaller than *leucophthalma*, slightly more solid, the lip more broadly expanded; bluish-white with many light green revolving bands and lines on the last half or more of the last whorl. Whorls only $3\frac{1}{2}$.

Alt. 21, diam. 32 to 35.5 mm.

H. leucophthalma Pfr. was thought at first to be from Celebes, but the locality Great Sangi Island was pointed out by Ancey several years ago, and the Sarasins collected it there, and have figured the snail laying its eggs in a folded leaf, in their great work on Celebes (p. 204, plate 27). Pfeiffer described and figured *leucophthalma* as covered with a thin tawny cuticle, irregularly streaked, and having two narrow brown bands above, two wider ones on the base; and it measured, alt. 21–22, diam. 42 mm., whorls nearly 4. His description and figures are reproduced in Manual of Conchology, Vol. VII, p. 113, pl. 26, f. 16, 17.

The specimens I have seen from Great Sangi agree better with those described by Sarasins. The spire is transparent-white, as usual; the last whorl is covered with a chestnut or wood-brown or olive-brown cuticle, which is darkest behind the lip, and fades out to almost white at the beginning of the whorl. This cuticle is obscurely streaked with darker, and shows traces of darker spiral bands and lines. Around the axis there is a paler area. In another shell, a ground similar to that just described is cut into bands above the periphery by white spiral zones, and there is a large white axial area. These shells are figured, plate IV, figs. 3, 4. They measure 39 to 41 mm. in diameter. *H. leucophthalma* evidently belongs to the subgenus *Corasia*, not to *Crystallopsis*.

It is possible that Pfeiffer's types were from another island of the same group, or they may have been merely from another colony on Great Sangi. Such local color-races often exist in close proximity.

Xesta cincta (Lea).

Also found in Celebes, in several varieties.

PUBLICATIONS RECEIVED.

How Fulgur and Sycotypus Eat Oysters, Mussels and Clams. By Harold Sellers Colton (Proc. Acad. Nat. Sci., Phila., 1908). The behavior of specimens kept captive in a salt-water aquarium in the vivarium of the University of Pennsylvania has been studied by Mr. Colton. His observations contradict the prevalent impressions as to the feeding of conchs, and should lead to further work on the subject. We quote part of Mr. Colton's observations on *Fulgur* (*Sycotypus*) *canaliculatum*: "The *Sycotypus*

had not been fed for a month or so . . . . It attacked one of the oysters five minutes after I placed them with it. . . . The *Sycotypus* crawled on top of the oyster, which closed its valves. The conch waited two minutes when the oyster opened its valves. Rotating its shell on the axis of the columella through an angle of 70°, it thrust its own shell between the valves of the oyster and introduced its proboscis between the shells. Forty minutes later it left the empty shell.

"*Sycotypus* does not wedge the shells of *Mya* apart, because it can get at the soft parts without doing so, since the valves gap slightly. To test this I introduced an oyster that had had three-quarters of an inch broken from the margins of both valves on the end away from the hinge so that the valves appeared to gap. I found that *Sycotopus* attacked this one in the same manner as it attacked *Mya* and did not wedge the shells apart.

"*Fulgur* eating *Venus* is a much more complicated case. The conch (*Fulgur perversa* or *F. carica*) grasps the *Venus* in the hollow of its foot, bringing the margin of the *Venus* shell against its own shell margin. By contracting the columellar muscle it forces the margins of the shells together, which results in a small fragment being chipped from the shell of *Venus*. This is repeated many times and, finally, the crack between the valves is enlarged to a width of 3 mm. or more. The proboscis is normally about 5 mm. to 8 mm. in diameter. There are three ways in which it may get at the animal. First, it may flatten out its proboscis so that it will go through the crack; secondly, it may pour in a secretion between the valves which kills the clam, and, thirdly, it may wedge its shell between the valves of the *Venus*. By contracting its columellar muscle it may actually wedge the valves apart. *Venus* never opens its valves of itself when it is in the grasp of a *Fulgur*, while *Ostrea*, after the first shock, opens wide its valves as if no danger was near.

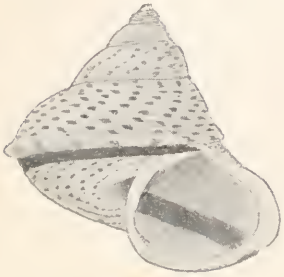
"*Fulgur* and *Sycotypus* often break their own shell when opening oysters and clams, and this accounts no doubt for the irregular growth-lines seen on their shells.

"This method of inserting the margin of a gasteropod between the valves of a Lamellibranch has been noticed before. Francois (1890) briefly reports that *Murex fortispina* has a special tooth on the margin of its aperture for the purpose of inserting between the valves of *Arca*. It may be that this manner of attacking the soft parts of bivalves is a very common habit of Prosobranch mollusks."

The several stages in the processes described are fully illustrated.

NOTE.

The scarcity of "copy" during the summer months has caused us to issue a single number for August and September. The usual number of pages for the year will be made up by enlarging a future number. Plate IV. will appear next month.



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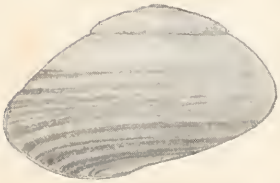

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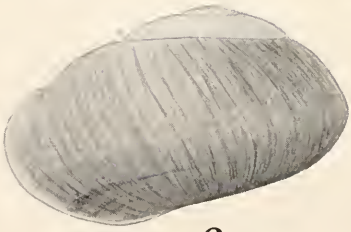

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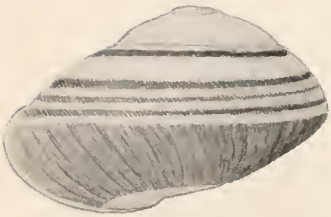

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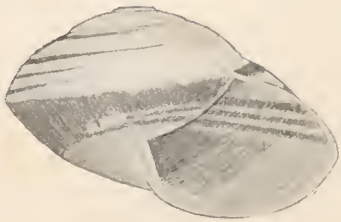


LAND SHELLS OF TANGULANDANG AND SANGI.

The Nautilus.

Vol. XXII. OCTOBER, 1908. No. 6.

SOME NOTES ON THE LOCOMOTIVE DISK OF STYLOMMATOPHORA.

BY V. STERKI.

During 1907 I made some studies and observations on the morphology of some of our land snails, and especially on the foot. The results were very incomplete and fragmentary; but the notes respecting the sole and "locomotive disk" appear to be of some interest, and a summary of them is here given.

Of about thirty-seven species, I had occasion to observe living animals, and of some of them preserved specimens could be compared. The results obtained are somewhat at variance with those published by other conchologists, which appear to have been obtained mainly from preserved material.

It may be mentioned that a piece of thin glass is conveniently used to let the snails creep on. In this way, the sole can not only be seen with the naked eye, but lenses and even strong doublets can be used, and the foot seen in both reflected and transmitted light. If kept on a slide, upside down, minute snails can be examined and observed under a low-power microscope. It is recommended to fasten a few small slips or narrow strips of glass on the glass plate, best a pair of them close together, in order to observe the shape and motions of the sole when detached from the even surface, while a snail creeps over these obstacles.

The majority of the snails showed locomotive waves on the under surface of the foot while creeping. On about one-third, none could be seen. The waves proceed from the posterior end, or from near

the same, following each other towards the anterior, but in some instances do not reach the latter. The number of simultaneous waves is various in the several species, genera and groups, but rather constant in one species; they also vary in extent, and may be faster or slower, regular or irregular, very distinct to more or less obscure. In most species, they are confined to a median zone of the sole, narrower or wider, corresponding with the so-called locomotive disk. In some species, resp. groups, that disk is marked off from the marginal zones by a more or less marked line, more or less distinct in alcoholic specimens. But in some the zones are not noticeable on the dead body, while in the living, creeping animal, the waves are very distinct and sharply restricted to the median zone. This was especially noticed in *Polygyra* (*Stenotrema*, *Triodopsis* + *Mesodon*), and in *Helix hortensis*, for which the existence of a disk has been denied; also in some of the *Zonitidæ*, *Agriolimax*, *Vertigo*, *Succinea*. But there are noticeable differences, as will be stated later on.

In a few snails, of various groups, the waves extend over the whole width of the sole, *e. g.*, in *Circinaria concava* Say, *Vallonia* sp., *Bifidaria armifera* Say. There are no marginal zones in these, so far as I was able to see, and it is probable that the muscles of the sole are different, comparatively wider than the others.

In a number of others, no waves could be seen, and no differentiated longitudinal zones. Such were: part of the *Zonitidæ*, such as *Gastrodonta ligera*, *Zonitoides nitidus*, *arboreus*, *minusculus*, all *Patula*, *Helicodiscus*, *Philomycus*. Moreover, it appears that at least in the *Zonitidæ* cited, the sole is of a formation different from that of, *e. g.*, the *Polygyræ*: it seems that an additional layer of tissue is superposed on the under surface of the foot. The surface has a different appearance, the sole seems thicker, and the double lateral lines, above the margins of the foot appear to point to the same conclusion. Unfortunately, I had no time to make exact anatomical and histological examination of these parts, but some anatomist may take the subject up.

It is interesting and significant that such differences are found among our *Zonitidæ*. It has been pointed out, long ago, by some scientists, that the family includes some widely different forms or types, with all similarity of the shells, and even the radula, etc. And it will be noted that, *e. g.*, *Gastrodonta* and *Zonitoides*, which were denoted as showing no locomotive waves, no longitudinal zones,

and a peculiar formation of the sole, are among those *Zonitidæ* which are provided with a dart sack and dart, while *Omphalina* and *Hyalina* (= *Vitrea*) are devoid of such. It is possible that the formation of the foot may add features of distinction between various natural groups of this complex family, and in close connection with it may be the presence or absence of a caudal mucus gland (and mucus pore).

Systematic Review.

ZONITIDÆ.

Omphalina fuliginosa Griff. Locomotive waves in a median zone which is marked off by slight superficial lines, which are slight furrows when the sole is detached from a surface. The waves are not as distinct as, *e. g.*, *Polygyra*, and apparently more remote from the surface of the sole.

Hyalina (*Vitrea*) *indentata* Say and *radiatula* Ald. Waves in a median zone, in the anterior $\frac{2}{3}$ or $\frac{3}{4}$, indistinct, and mostly not seen at all near the posterior end. The surface layer undulating forward and backward over [under] each advancing wave.

Gastrodonta ligera Say. No waves seen. Foot and sole as described above, for this and the four following species. A darkish median line is ill-defined and has nothing to do with a locomotive disk.

Zonitoides nitidus Müll., *arboreus* Say, *minusculus* Binn., *Euconulus chersinus* Say. No waves; no zones seen.

LIMACIDÆ.

Agriolimax campestris Binn. Waves in narrow median zone, following each other in rapid succession, about ten simultaneously, while the surface layer of the sole shows forward and backward undulation with each wave. When the animal proceeds slowly (for a snail!), the waves are more or less irregular, even undulating, and sometimes no waves can be seen when the animal moves very slowly. This has been noticed also on some other snails.

CIRCINARIIDÆ.

Circinaria concava Say. The waves extend over the whole width of the sole; the same was seen on a very small, young specimen; no zones seen.

HELICIDÆ.

Polygyra hirsuta, fraterna, tridentata, fraudulenta, inflecta, palliata, mitchelliana, thyroides, albolabris and var. *minor, profunda:* waves very distinct, in a rather sharply defined median zone, regularly proceeding from the posterior end to the anterior, about 7 or 8 simultaneously in *hirsuta* and *fraterna*, 10 to 12 in the large species. Marginal zones with fine radiating lines.

It may be noted here, in a general way, that the number of waves is easily over-estimated, and it is somewhat difficult to count them, if more than two to four.

Helix (*Tachea*) *hortensis* Müll. Zones plainly visible! the marginal areas rather narrow; waves, in the median, distinct.

Vallonia pulchella, excentrica, costata: no zones seen; waves extending over the whole width of the sole, rather fast, about four simultaneously. The waves can be seen in lateral view, in transmitted light.

NOTE.—There is a possibility, however, that in these and other minute snails, narrow marginal zones exist and have been overlooked, to which the waves are transmitted.

ENDODONTIDÆ.

Patula solitaria, alternata, perspectiva, striatella, Helicodiscus lineatus Say: no zones seen, and no waves. It seems that the formation and texture of the sole are rather different from those of *Polygyra*, and more like those of *Gastrodonta* and *Zonitoides.*

PHILOMYCIDÆ.

Philomycus carolinensis Bosc., and another species which is probably distinct: no zones, and no waves seen.

PUPIDÆ.

Bifidaria armifera Say. No zones seen; waves extending over the whole width of the sole, about four simultaneously, rather irregular, and often disappearing before reaching the anterior end, and apparently commencing anywhere, also stopping and quasi rebounding anywhere; in short, more irregular than in any other species. This seems to be concordant with the jerky motion of the animal.

Vertigo ovata Say. Sole with three zones, the median one widen-

ing towards the anterior end so that the marginals disappear. Waves distinct, in the median zone, two to three simultaneously.

Vertigo tridentata Wolf. Waves seen; other details in doubt.

SUCCINEIDÆ.

Succinea avara Say. Sole with three zones; waves in the median, 3–4, rapidly moving forward, each one drawing along parts of the marginals. The surface layer moves forward and backward, undulating, with every wave passing. When part of the foot is detached from its support, the waves can be seen there proceeding on the more or less contracted and folded sole.

S. retusa Lea. Three zones, median one with 4–5 waves.

PALUDESTRINA SALSA, PILSBRY.

BY REV. HENRY W. WINKLEY.

It seems odd that a species so widely distributed, and fairly abundant, should have escaped the eyes of New England collectors so long. Yet its dwelling-place is peculiar. A word as to where it occurs may be of interest. It was first noticed by the writer at a spot where a brook enters the marsh at Branford, Conn. The site is probably three miles inland from Long Island Sound, and the water at this spot must be fresh. Later I found it more abundant on vegetable matter in a ditch in the marsh near the railroad in Branford and a mile nearer the sound. The waters here would be brackish. I have not seen the locality where Mr. Owen Bryant found it at Cohasset. Last summer I located it in a pot hole in the marsh at Wareham, Mass. This locality showed it in a pot hole without an outlet. I have not seen it in such a place elsewhere. The locality mentioned in my last article in the NAUTILUS (vol. XXI, p. 75) where my daughter found it at East Wareham, was among flags near the border of the Agawam river. The character of the water may be understood from the fact that I was in mid-stream examining *Unio complanatus* when she found *P. salsa* in the same river. Last winter I took up a residence in Danvers, Mass., and have found *P. salsa* here. Two localities reveal it; both are spots where the water ebbs and flows, and not closed pot holes.

Danvers lies back of Salem and Beverly at the headwaters of a branching bay. A few days ago I made a trip to Plum Island. Leaving the train at Rowley, I found *P. salsa* in a small ditch close to the railroad station. A half-mile further down *Litorinella minuta* was abundant in closed pot holes, but *P. salsa* not there. I do not recall finding the two in company, yet they are often near neighbors. We now have a distribution of this species from the New Haven area in Conn., to Rowley, Mass., just north of Cape Ann, and very near the New Hampshire line.

A NEW CŒCUM.

BY REV. HENRY W. WINKLEY.

Cœcum Johnsoni n. sp.

Shell minute, tusk-shaped, slightly tapering, lightly curved. $2\frac{1}{2}$ mm. in length, $\frac{1}{2}$ to $\frac{3}{4}$ of a millimeter in diameter. Apex plug protrudes in a dome shape. Aperture circular, end of the tube at the apex is at right angles to the longer axis of the cylinder. Aperture end at an angle, sloping towards the convex side, color dull white to horn color, surface marked by lines of growth, but not ribbed.

Dredged at Woods Hole, Mass., on gravel bottom in 2 to 3 fathoms. Easily mistaken for *C. pulchellum*. In size, color and form it resembles that species but lacks the ribs, and the dome-shaped plug in the apex is not seen in *pulchellum*. Types in Winkley collection.

It gives me much pleasure to name this shell for one who has shown himself a lover of the science, and a friend to his fellow-workers, Mr. C. W. Johnson, of the Boston Society of Natural History.

A SMALL ADDITION TO THE KNOWLEDGE OF THE DANISH MOLLUSCAN FAUNA.

BY HANS SCHLESCH, COPENHAGEN.

About 15 miles north of Copenhagen on the beautiful coast of the Sound stands the pretty village of Rungsted, where many well-to-do people from Copenhagen have their summer villas. Between Rungsted and Horsholm (German Hirschholm) and a mile to the

west, where King Christian VI erected a castle, we find a woods called "Polehaven." It was formerly used as a park for the now demolished castle. In the edge of the woods opposite the railway station of Rungsted and in the meadow between the woods and Rungsted I found the species of mollusks mentioned below. My friend Mr. Niels Petersen has assisted me in collecting these.

Limax maximus Linné, is very rare. I have also found some other species of *Limax*, but up to now I have not been able to determine them.

Vitrina pellucida Müller, is very common.

Arion empiricorum Ferussac is found over the whole place.

Besides *Polita cellaria* Müller, some other species of *Hyalina* as *Conulus fulvus* Müller are found at both localities.

Punctum pygmaeum Draparnaud.
Patula rotundata Müller.
Vallonia pulchella Müller.
Vallonia costata Müller.
Trichia hispida Linné.
Monacha incarnata Müller.
Eulota fruticum Müller.
Eulota f. v. fasciata Moq. Tand.
Eulota f. v. alba-unifasciata Hesp.
Eulota f. v. abina.
Arianta arbustorum Linné.
Arianta a. v. trochoidalis Roffiaen.
Arianta a. v. roseolabiata Schlesch nov. var.[1]
Arianta a. f. scalaris. One specimen only.
Tachea nemoralis Linné.[2]
Tachea n. f. major.
Tachea hortensis Müller.
Tachea h. v. roseolabiata.
Tachea h. v. fascis-transparenti bus (= *v. albina*).
Helicogena pomatia Linné.
Clausiliastra laminata Montagu.
Clausiliastra l. v. granulata Ziegler.
Pirostoma bidentata Strom.
Pirostoma b. v. septentrionalis A. Schmidt.
Pirostoma plicatula Draparnaud.
Pirostoma pumila Ziegler.
Napaeus obscurus Müller.
Vertigo antivertigo Müller.
Vertigo pusilla Müller.
Vertigo angustior Jeffreys.
Cochlicopa lubrica Müller.
Succinea putris Linné.
Succinea p. v. albina.
Succinea pfeifferi Rossmässler.
Succinea p. v. albina.
Carychium minimum Müller.

[1] The mouth brim is rose-colored as *Tachea hortensis* Müller var. *roseolabiata* Rare.

[2] Mr. Niels Petersen has given me some specimens found at Rungsted, the ribs of which are so marked that they look as if they belonged to *Tachea austriaca* Mühlfeldt.

MESESCHIZA GROSVENORII, LEA.

BY A. A. HINKLEY.

A few remarks on this subject in addition to the writer's notes in the NAUTILUS for May, 1901, may not be amiss. The Wabash river was visited in August of the present year, at several places in Posy county, Indiana. The writer was determined to find the form described by Dr. Lea under the above name if it still existed.

On the "Chains" where a stream of water passed with considerable current, the young *Angitrema armigera* were in large numbers on the under side of the rocks. Here the *Meseschiza* form was found quite plentiful, and some three hundred specimens were taken. It is a characteristic lot of young *Angitrema armigera*, with the exception of the notch in the lip, showing all the variations of color markings. The notch varies as to development and location. Of the specimens taken, twenty-five per cent. or more have the notch at the perifery; in many of these a line of lighter color is left to mark the former positions of the notch, this line does not precede the notch on any other part of the shell.

These notched forms were only found where the water had a strong current; and it was not confined entirely to *Angitrema armigera*, for specimens of *Pleurocera* and *Vivipara subpurpurea* were taken in the same situation with the same peculiar notch.

Pyrgulopsis wabashensis was found on water plants in quiet water, on moss-covered rocks and timbers where there was some current at the water's edge, and at the old dam near New Harmony they were found in mid-stream, on rocks covered with a little moss and sediment.

DESCRIPTIONS OF NEW HAWAIIAN MARINE SHELLS.

BY H. A. PILSBRY AND E. G. VANATTA.

BITTIUM HILOENSE n. sp. Fig. 1.

The shell has the usual oblong-turrite shape, and is uniform yellowish gray-white except the swollen, slightly exserted first whorl,

which is opaque white and smooth. Subsequent whorls are flattened but separated by a deep suture, the earlier ones having two spiral beaded cords. At the end of the first $3\frac{1}{2}$ to 4 whorls a third spiral cord appears. The last whorl is rounded periferally, and has about 10 spiral cords, separated by spaces of about their own width; the upper 5 or 6 are nodose at the intersections of low, narrow, vertical folds, which do not extend below the perifery. The last whorl has a low, rounded, rather massive varix behind the outer lip. Aperture oval, produced in a short, deep channel at the base.

Length 3.34, diam. 1.39 mm.; whorls $6\frac{1}{2}$.

Hilo, Hawaii. Types no. 95906 A. N. S. P., collected by Mr. D. Thaanum.

This tiny *Bittium* is somewhat related to *B. leucocephalum* Wat-

Fig. 1.

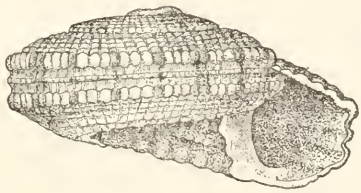


Fig. 2.

Fig. 3.

son, described from the reef at Honolulu, from which it differs in many details of shape and sculpture. Watson's type is evidently an immature shell, smaller than *B. hiloense*, but it has 8 whorls, while *hiloense* has but $6\frac{1}{2}$.

Torinia discoidea sterkii n. subsp. Fig. 2.

The shell is depressed, biconvex with flat perifery, widely umbilicate, the width of umbilicus contained 2.6 times in that of the shell.

First whorl is smooth, convex and bicolored, a spiral deep reddish-brown band half the width of the whorl revolving below the suture; on the second whorl this band spreads, becomes diluted, and finally disappears. Last whorl grayish, with white and brown spots along the periferal beaded cords. The last whorl has 5 beaded spiral cords above, the first and fifth larger; a beaded spiral lies between the two cords at the periferal angles. The base has 7 beaded spirals, the outer one and three inner larger than the others. Suture channeled. Alt. 2.3, diam. 4.6 mm.

Waikiki Beach, Honolulu, H. I. (F. Stearns). Types in the collection of the Academy of Natural Sciences of Philadelphia, No. 93833.

Differs from typical *T. discoidea* Pease in having one more spiral row of beads on the upper surface of the whorls and in having a small spiral row of beads between the two peripheral larger rows. It is also darker in color. The type specimens were picked from shell-sand by Dr. V. Sterki, in whose honor it is named. The same form was taken at the Marquesas Islands by C. D. Voy.

Turbonilla (Chemnitzia) thaanumi n. sp. Fig. 8.

The shell is very slender, turrite, slowly tapering, a little more rapidly so near the summit; somewhat translucent white. One nuclear whorl is planorboid, its axis not quite at a right angle with that of the shell, but a little oblique. Post-nuclear whorls are sculptured with rounded ribs, slightly oblique and gently sigmoid, equal to the intervals, and extending from suture to suture. On the last whorl there are 22 axial ribs; and the intervals parting them stop abruptly a short distance below the periphery, leaving the rest of the base smooth. There is no spiral sculpture. The sutures are deeply impressed; whorls evenly convex. The aperture is about one-fifth the total length, ovate. Columella nearly straight, somewhat concave below, gently convex above.

Length 3.1, diam. 0.82 mm.; post-nuclear whorls $8\frac{1}{2}$.

Hilo, Hawaii. Type no. 95907 A. N. S. P., collected by Mr. D. Thaanum.

This species differs from the Hawaiian *T. decussata* Pease by the absence of spiral sculpture.

NOTES.

Those interested in that most fascinating group, the Cephalopods, are quite likely to overlook a recent interesting contribution to our knowledge of the natural history of two of the larger species of cuttlefish and squid. The reference is to a chapter called (somewhat misleadingly since largely occupied with an account of the Californian octopus *Polypus punctatus*) "Ten Armed Game," occupying pp. 49–64 in Charles F. Holder's book "Big Game At Sea" (The Outing Publishing Co., 1908).

The book is an account of sporting experiences written for sportsmen and by no means pretends to be scientific, but bears internal evidence that the author is quite aware not only of the difference between imagination and testimony to fact, but of the distinction between first and second-hand testimony. In short, one judges that he has actually seen and done just about what he says he has—though he does not purport to state with the accuracy of a trained naturalist—and if so he has had experiences with giant forms of cephalopods most rare to men sufficiently educated to put them before the public.

There are three excellent full-page photographs, two of "giant octopi" from California (one "fifteen feet across"—*i. e.*, tip to tip of spread tentacles—the other, size not given, said in text to grow to twenty-five or thirty feet), and one of a "large squid caught at Avalon, Santa Catalina Ids.," by the author. The latter picture is extraordinary if not absolutely unique. It does not look "faked," unless perhaps about the eye, and the animal appears fresh if not actually alive, while the detail is clear. Unfortunately no measurements are given, nor is there any object in the picture to serve as a scale, while the text is annoyingly ambiguous. The author states that the length of the largest squid actually handled and measured by him was fifty feet (of which the long pair of tentacles made thirty), but rather implies that this was a Newfoundland specimen, presumably of *Architeuthis princeps* which Verrill has so elucidated.

Squids ranging from seven to eight feet in length are stated to be common on the California coast, where they may be watched in schools from boats—one would think with some slight misgivings if the boat were very small. Probably the figure is of one of these, though it somehow gives the impression of being larger—at all events it is self-evidently not an *Architeuthis*.

Those interested must read the chapter for themselves and regret its shortness and shortcomings, with the hope that the author may give students the benefit of a more full and exact account of the results of his unusual opportunities in this direction.

Anyone who has ever studied living squids cannot but delight in his simile of the sheet-lightning of a setting thunder-storm for the color-play of the chromatophores. At all events it bears the hall-mark of genuine observation.—F. N. Balch.

Lotorium felipponei *n. sp.* by H. von Ihering, Buenos Aires, 1908. A new species of the "*Triton*" *pileare* group is described and figured in this paper, issued as a separate publication. It was found at Maldanado, Uruguay, by Dr. Florentino Felippone, of Montevideo.

Errata.—In the June number, the following corrections should be made. Page 15, line 19, for "[now Bergh]" read [*non* Bergh].

P. 16, line 9, for "now" read "*non* Coryphella bostoniensis (Couth.)."

Mrs. George Andrews died at her home, Circle Park, Knoxville, Tenn., on Saturday, September 5th. Many conchologists, especially those of us whose activity in the science dates back twenty years or more, were friends or correspondents of Mrs. Andrews, and will hear of her death with sorrow. A notice of Mrs. Andrews's life will follow.

Mr. Jas. H. Ferriss is exploring the mountains of Arizona for land shells, ferns, etc., intending to return about the first of November.

Dr. John B. Trask, a pioneer of science on the West Coast, is the subject of an interesting article by Dr. R. E. C. Stearns (*Science*, Aug. 21). Trask went to California in 1850 and was one of the little coterie who founded the California Academy of Science. He discovered many mollusks, among other scientific labors, *Epiphragmophora traski*, and several other species bear his name.

The Nautilus.

Vol. XXII. NOVEMBER, 1908. No. 7.

A GIGANTIC SOLEMYA AND A NEW VESICOMYA.

BY WILLIAM HEALEY DALL.

In the course of the Albatross dredgings in the Philippines during the period in which Dr. Paul Bartsch of the U. S. National Museum was attached to the scientific staff of that vessel, a dredging was made between the islands of Ticao and Masbate in 600 fathoms. Among the objects obtained from this haul (station 5215) was the fresh shell of a *Solemya*, which, compared with the previously known species, may be regarded as enormous. Nothing remained of the soft parts which had evidently been but recently lost.

Solemya (*Acharax*) *bartschii* n. sp.

Shell subcylindrical, gaping at the ends and along the base, covered with a strong polished black periostracum which extends over the margins, being continuous over the dorsal portion between the valves and produced beyond the edges of the shelly portion, basally about 40, in front about 35, and behind about 15 millimeters. In life this produced periostracum, undoubtedly covers and protects the portions of the surface of the animal not sheltered by the calcified valves; the margin at the anterior end is not split into strips corresponding to the radii of the shell as in the large American species of the group, but preserves its continuity and is contracted marginally so that in life it must closely cover the whole anterior end of the animal, in a dome-like manner. Internally the ligament is wholly

opisthodetic but in front of the beaks the periostracum is produced inside the dorsal margin as well as externally. This interior extension covers a narrow strip of the thickened dorsal margin of each of the valves, leaving about two-thirds of these pseudo-nymphs bare and strongly radially grooved and striate, the radii diverging from the dorsal margin of the valves slightly in front of the beaks, and doubtless serving to make more efficient the local attachment of the periostracum, which is here thickened and expanded. The ligament is wide and strong, external, but visible in the gap between the valves behind the beaks and supported by heavily calcified nymphs. Behind the nymphs the dorsal margin of the shell on each side exhibits a long and conspicuous indentation. The valves are heavily calcified, internally radiately striate, the ventral margin straight, the dorsal margin nearly parallel to it except as modified by the nymphs, the two valves touching only near the beaks, which are low but swollen, the rather narrow dorsal interval between the valves being covered by a continuous sheet of the thick periostracum. The posterior muscular impression is of moderate size and obliquely ovate, the anterior smaller, narrow and rhomboid in shape; the pallial line is obscure and continuous, situated close to the margin of the valves; externally the surface is smooth except for lines of growth and a number of shallow, wide, radiating channels which proceed from the beaks toward the margin of the valves, where they produce a certain amount of undulation. Anteriorly there are eight, posteriorly six of these channels, with a median space which has no rays, and, on the basal margin of the valves, is about 50 mm. wide. The beaks are about 75.0 mm., in front of the posterior end. The shelly part of the valves is 191 mm. long (the total length including periostracum is about 240 mm.), the height 62 mm. (with periostracum about 100 mm.), and the estimated diameter of the valves in life about 60 mm.

The perfect condition of this specimen enables us to understand the origin and use of the striated and thickened area of the anterior dorsal margin of the values, already noted by me in *S.* (*A.*) *agassizii* from the Gulf of Panama. To preserve it in its present satisfactory state it will be kept in alcohol.

With this remarkable specimen was obtained an interesting shell of *Vesicomya*, also without the soft parts, which may be described as follows :

Vesicomya ticaonica n. sp.

Shell ovate, tumid, inequilateral, with the beaks within the anterior fourth of the length, low, prosocoelous, tumid, overhanging a large cordate lunule, of which the left valve carries a somewhat large portion; surface rude, sculptured irregularly and strongly by incremental lines; periostracum brownish, covering a livid whitish shell; ligament rather long, set in a deep, narrow groove; hinge as usual in the genus; interior chalky-white except the polished muscular impressions; pallial line broad, slightly irregular, with a feeble insinuation below the posterior adductor scars; shell thin, margins entire. Length 63, height 45, diameter 30, the beaks behind the anterior end 15 mm. The ligament is about 22, and the lunule 14 mm. in length. The shell is more tumid and more attenuated in front of the beaks than any other described species and exceeds most of them in size.

THE MOLLUSCA OF MCLENNAN COUNTY, TEXAS.

BY JOHN K. STRECKER, JR.

In 1883, Mr. Henry Hemphill sent a few species of shells from Waco, to Dr. W. G. Binney. These specimens are now in the Binney collection in the United States National Museum (see Manual of American Land Shells, Bull. U. S. Natl. Mus., No. 28, 1885, pp. 477, 485, etc.). I have been unable to find any examples of two of the species recorded, i. e., *Praticolella griseola* Pfr. and *Vitrea sculptilis* Bland.[1]

In Singley's list of Texas Mollusca (Report Geol. Survey of Texas, 1893, pp. 299–343) several species of McLennan county shells are mentioned. I include *Bulimulus d. schiedianus* Pfr. in my list on this authority, although I have not collected it personally.

Examples of all of the other species mentioned in this paper have been collected by me during the past two years. Future investigations will doubtless bring others to light but as local lists of Texas

[1] The records of these two species from Waco are in all probability erroneous; the specimens identified as *griseola* must be a thin form of *P. berlandieriana*, and the supposed *V. sculptilis* is *V. indentata umbilicata*.—Ed.

Mollusca are exceedingly few and far between, I feel that my list is sufficiently complete for publication at this time.

During the present year, the heavy rises and great floods have played havoc with the various species of univalves inhabiting our smaller streams. In 1907 a light-colored variety of *Planorbis tumidus* Pfr. was found in Waco Creek in countless thousands but in July of the present year repeated visits to the most favorable places on this stream failed to result in the finding of a single living specimen.

In April, 1908, I collected a large number of examples of *Lymnæa bulimoides techella* Hald and *Physa mexicana conoidea* C. & F. in a small stream flowing through Lindsey's Hollow. As my time was limited, I left the collecting of a still larger series until another time. A month later, during the flood, all of the mollusks in the stream were washed into the Brazos River.

On the other hand, the drying-up of most of the smaller water courses in the latter part of the summer is also responsible for the destruction of many species. In places along Hog Creek, during the dry season, I have found thousands of fresh dead shells of *Physa forsheyi* Lea, *Planorbis bicarinatus* Say and *Planorbis tumidus* Pfr. lying together in one heap. In the same place, on a bed of sand and gravel, I have found half-grown living examples of *Anodonta imbecilis* Say. The bed of this stream, in some places, is composed of pebbles and small boulders to a depth of 18 or 20 inches, and when the naiads are left high and dry it is impossible for them to burrow down to the line of moisture.

At Day's Lake I have found living specimens of a variety of *Unio tetralasmus* Say that must have been out of the water for several months. They were half buried in a bank of dry earth about five feet above the water line. This Unio is much more tenacious of life than our species of *Quadrula* and *Lampsilis*, as a very few hours in the sun usually suffices to kill them.

Thanks are due to Mr. Bryant Walker of Detroit who kindly identified most of the species on the list. Also to Mr. W. B. Marshall, U. S. Natl. Mus. Washington, D. C., and Dr. W. S. Strode, Lewistown, Ill., to whom the others were referred.

Helicina orbiculata tropica Jan.
Praticolella berlandieriana Moricand.
Praticolella griseola Pfr.
Polygyra dorfeuilliana Lea.
Polygyra dorfeuilliana sampsoni Weth.
Polygyra mooreana W. G. B.
Polygyra texasiana Moricand.
Polygyra roemeri Pfr.
Polygyra monodon fraterna Say.
Bulimulus dealbatus liquabilus Rve.
Bilimulus dealbatus mooreanus Pfr.
Bulimulus dealbatus schiedianus Pfr.
Strobilops labyrinthica texasiana P. & F.
Pupoides marginatus Say.
Bifidaria armifera Say.
Bifidaria contracta Say.
Bifidaria tappaniana C. B. Ad.
Bifidaria pentodon Say.
Bifidaria procera cristata P.& F.
Bifidaria pellucida hordeacella Pils.
Vitrea sculptilis Bland.
Vitrea indentata Say.
Vitrea indentata umbilicata Singley.
Vitrea dalliana roemeri P. & F.
Euconulus fulvus Mull.
Euconulus chersinus trochulus Reinh.
Zonitoides arboreus Say.
Zonitoides minusculus Binn.
Zonitoides singleyanus Pils.
Limax flavus Linn.
Philomycus carolinensis Bosc.
Pyramidula alternata Say.
Helicodiscus eigenmanni P. & F.
Punctum pygmæum Drap.
Succinea avara Say.
Carychium exile H. C. Lea.
Planorbis bicarinatus Say.
Planorbis liebmanni Pfr.
Planorbis parvus Say.
Planorbis trivolvis Say.
Planorbis tumidus Pfr.
Physa mexicana Ph.
Physa mexicana conoidea C. & F.
Physa forsheyi Lea.
Physa rhomboidea Crandall.
Physa osculans Hald.
Amnicola peracuta P. & W.
Lymnæa desidiosa Say. (Variety?)
Lymnæa bulimoides techella Hald.
Calyculina transversa Say.
Tritogonia tuberculata Barnes.
Quadrula forsheyi Lea.
Quadrula aurea Lea.
Quadrula pustulosa Lea. (Smooth variety.)
Anodonta imbecilis Say.
Lampsilis gracilis Barnes.
Lampsilis purpuratus Lamarck. (Variety.)
Lampsilis berlandieri Lea.
Lampsilis berlandieri Lea. (Variety.)
Lampsilis anodontoides Say.
Lampsilis parvus Barnes.
Lampsilis texasensis Lea.
Lampsilis ventricosus satur Lea.
Lampsilis lævissimus Lea.
Plagiola macrodon Lea.
Unio tetralasmus Say.
Unio tetralasmus manubius Say.
Unio tetralasmus camptodon Say.

NOTES.

Polygyra mooreana W. G. B.

Near the gravel pit north of Waco, I found two adult and three juvenile specimens of a variety of this species with a hirsute epidermis. Three of these were found under a rock lying at the foot of gravel bank. A fourth was attached to the under side of a plank lying across a spring about three or four yards away. The fifth example was crawling around in the damp grass about a yard from the spring. In the living specimen, the hairs are very conspicuous and stand straight out from the shell. Living examples of the ordinary type were afterwards found on all the surrounding elevations, but the hirsute variety seems to be confined to the vicinity of the spring.

Limax flavus L.

This species is now common, but must have been introduced within the last three years. Prior to that time a great many slugs were collected by students of the Biological Department of Baylor University. These are now in the University Museum, and all prove to be specimens of the native species *Philomycus carolinensis* Bosc. Most of my examples of *L. flavus* were captured during the spring of the present year.

Planorbis trivolvis Say.

This pond snail is rare. All of the examples I have seen came from Day's Lake about five miles notheast of Waco.

Planorbis tumidus Pfr.

This species is our most abundant *Planorbis*. A large, light-colored variety was formerly abundant in Waco Creek. A small, depressed form is found in Hog Creek in considerable numbers.

Physa sp.

Imperfect specimens of an indeterminate *Physa* were picked out of drift material on the Middle Bosque River. The spire was broken in all these specimens and while Bryant Walker stated that he was certain that they were different from anything that I had sent him before, he was unwilling to attempt to name them until he could examine more perfect material.

Lymnæa sp.

We have at least one other species of *Lymnæa* but of this form only juvenile examples, too young for determination, have been collected.

Quadrula pustulosa Lea.

A smooth variety of this species is found associated with *Quadrula aurea* Lea. In this variety there are only a few small pustules near the umbones and in some specimens even these are lacking. Specimens identified by F. C. Baker and Bryant Walker. Several pustulous shells of this species that were supposed to have been collected in this county, prove to have come from southern Illinois.

Lampsilis purpuratus Lamarck (Variety).

A number of shells from near Mussel Island in the North Bosque River were first identified as typical *L. purpuratus* Lk. Later examples of the same type were identified as typical *L. berlandieri* by Dr. W. S. Strode and Mr. Bryant Walker. The last-mentioned gentleman found three different forms in a second sending from the same locality. These he designates as

Lampsilis berlandieri Lea.

Lampsilis berlandieri Lea var.

Lampsilis purpuratus Lamarck var.

The variety of *L. berlandieri* Lk., is very variable in the color of the nacre which ranges from white, through pink and salmon, to dark purple. These shells were found in the ripples above Mussel Island while the examples of the typical form and the specimens of *L. purpuratus* var., were found in a large bed some distance below.

DESCRIPTIONS OF NEW SPECIES OF ACHATINELLIDAE, FROM THE HAWAIIAN ISLANDS.

BY D. D. BALDWIN.

Partulina winniei n. sp.

Shell sinistral, subperforate, rather thin, elongately conical, apex subacute; surface shining, striated with fine growth lines, and under a lens showing very close and delicate decussating spiral striæ; nuclear whorls faintly decussated. Color white, striped and mottled irregularly with longitudinal dark brown streaks; apex white. Whorls 6, slightly convex, margined above. Aperture oblique, oval, purplish-white within. Peristome acute, thickened within, columellar margin reflexed. Columella terminating in a slight, flexuous, white fold.

Length 16; diam. 8 mm.

Habitat, Kahakuloa, West Maui.

This shell is the Maui counterpart of *Part. theodorei*, Bald., a much larger shell found on the Island of Molokai.

Named in honor of Miss Winnie of Walluku, Maui.

Partulina mutabilis, n. sp.

Shell dextral or sinistral, minutely perforated, somewhat solid, acuminately conical, apex subacute; surface shining, marked with delicate incremental striæ, under a lens exhibiting very close decussating, spiral striæ; apical whorls smooth. Color varying from pure white to dark fulvous, often variously striped with brown lines and bands, some on the base and others spiral. Whorls 6, convex, margined above, suture well impressed. Aperture oblique, oval, white within, columella margin reflexed. Peristome acute, thickened within. Columella terminating in a well-developed, flexuous white fold.

Length 16; diam. 10 mm.

Habitat, Waichu Valley, West Maui.

This shell seems to be the Maui counterpart of *Partulina variabilis*, Nc. a larger shell which is found on the neighboring island of Lanai.

Laminella duoplicata, n. sp.

Shell sinistral, sometimes slightly perforated, thin, elongately conical, apex obtuse; surface shining, marked with fine growth striæ, nuclear whorls smooth. Color light yellow, marked with somewhat regular black lineations, apex black, whorls six, convex; suture well impressed. Aperture a little oblique, oval, white within. Peristome simple, very thin. Columella white, biplicate, the terminal plication a thin, oblique lamellar plait, the inner one less prominent.

Length 12; diam. 6 mm.

Habitat, Waichu Valley, West Maui.

This and the following species are important additions to the Laminellæ of Maui. The only previously described Maui species of this section are *Lam. picta*, Migh., *Lam. alexandri*, Nc. and *Lam. erecta* Pse.

Laminella aspera, n. sp.

Shell sinistral, minutely perforated, thin, conical, apex obtuse,

surface exhibiting very coarse and irregular growth striæ. Color yellow, plain or marked with irregular black lineations, apex black. Whorls 6, convex; suture well impressed. Aperture a little oblique, sub-rotund, yellowish within. Peristome simple, very thin. Columella white, biplicate, not prominent.

Length 10; diam. 7 mm.

Habitat, Wailuku valley, West Maui.

This species is remarkable for the very coarse and irregular growth striæ exhibited on its surface.

Cotypes of these species deposited in the Acad. Nat. Sci. Phila. will be figured in the next volume of the Manual of Conchology.

THE MIOCENE SPECIES OF LYMNAEA.

BY T. D. A. COCKERELL.

In Bull. Am. Mus. Nat. Hist., Dec., 1906, I described two small species of *Lymnæa* from the miocene beds of Florissant. In 1907, at station 1, I found a much larger species, unfortunately not in the best state of preservation. I hoped to find more material in 1908, but as none was obtained, a description from the original type is now offered.

Lymnæa florissantica, n. sp.

Length 21 mm.; diameter about $10\frac{1}{2}$; spire short, scarcely over 5 mm. long, the whorls moderately convex; body-whorl not very convex, with coarse, shallow, vertical grooves. In Baker's key in his Mollusca of the Chicago Area, it runs nearest to *L. palustris*, but it is not at all like that species. It is in reality a miocene representative of *L. emarginata*. In Mr. O. O. Nylander's series of figures of *L. emarginata* (published by the author in a pamphlet, 1901), it closely resembles Pl. 1, f. 7, except that it is distinctly more slender, and the base is narrower, about as in fig. 8, though the rest of the shell is not at all like fig. 8.

The following table separates the miocene species of *Lymnæa*.

Spire short and rather obtuse,
body-whorl large . . . . . 1.

Spire rather or quite long, acute, the apex slender	2.	
1. Length over 20 mm., apparently related to *L. emarginata* . . .	*L. florissantica*, n. sp.	
Length 6 mm. or less, perhaps related to *L. catascopium* . .	*L. scudderi* Ckll.	
2. Small species, about 8 mm. long, closely related to *L. truncatula* .	*L. sieverti* Ckll.	
Larger species, over 18 mm. long .	3.	
3. Smaller, aperture about half length of shell; apparently related to *L. palustris*	*L. shumardi* Meek & Hayden.	
Larger, aperture over half length of shell; apparently related to *L. stagnalis*	*L. meekii* Evans & Shumard.	

L. shumardi and *meekii* are from the White R. beds; the others are from Florissant. *Lymnæa* was extraordinarily well developed in the Oligocene of Britain. As my memory serves me it seems that the minor modern groups were already well marked, and it may be considered probable that the types of *L. stagnalis*, *palustris* and *truncatula*, at least, were developed first in the old world, and reached America during the tertiary period. This is also suggested by the fact that the older (Laramie and Eocene) American species of *Lymnæa* do not suggest the modern circumpolar groups.

FALSE SHELLS.

BY C. W. JOHNSON.

Among the many specimens received from young collectors for determination there are occasionally non-molluscan forms so closely resembling shells, that they have been mistaken for mollusks; in fact, they have even deceived some of the more experienced conchologists.

In the more primitive crustacea, including the *Phyllopoda*, especially in the family *Estheriidæ* and the *Cladocera* and *Ostracoda*, the carapace is largely developed and forms a broad oval shell covering

entirely or most of the body, and divided into right and left halves, and hinged together on the dorsal line, thus giving the appearance of a bivalve mollusk.

Some of the insects also afford interesting examples. The larvæ of several species of caddice-flies, including the genus *Helicopsyche*, make spiral cases in which they live clinging to the rocks and stones in rapidly flowing streams. The little spiral cases composed of grains of sand, fastened together with silken threads resemble so closely the form of a *Trochus* or *Valvata* that Swainson (Treatise on Malacology, p. 353, f. 113, 1840), described one as the *Thelidomus braziliensis*, placing it in the family *Trochidae*, sub-family *Rotellinæ*. Dr. Isaac Lea (Trans. Amer. Phil. Soc., iv, 104, pl. xv, f. 33, 1830), described a similar larva case as *Valvata arenifera*.

In the Entomologist's Monthly Magazine, xxi, p. 1, 1884, Robert McLachlan describes and figures an "extraordinary heliciform lepidopterous larva case from East Africa." These closely resemble a high-spired *Helix* or *Vivipara*, both sinistral and dextral. The larva case of an allied species of Southern Europe, *Psyche* (*Cochloplanes*) *helix* is also figured, having the form of a small irregular helicoid shell. Larvæ of the genus *Microdon* of the dipterous family *Syrphidæ* have twice been described as land mollusks.

Numerous worm tubes of the family *Serpulidæ* formed by species of *Ditrupa* and *Pomatoceras* have frequently been described as *Dentalium* (see Pilsbry and Sharp, Manual Conch., xvii, 240).

NOTES.

Caught in a living trap.—In the window of a Salem, Mass., store may be seen a unique sight, that of a kingfisher held tightly in the grip of a mussel. The story is this:

This forenoon patrolman Michael J. Little while crossing Beverly bridge, saw the bird fluttering on the flats, and he asked a fisherman to investigate. The latter went to the spot and there found the bird drowned.

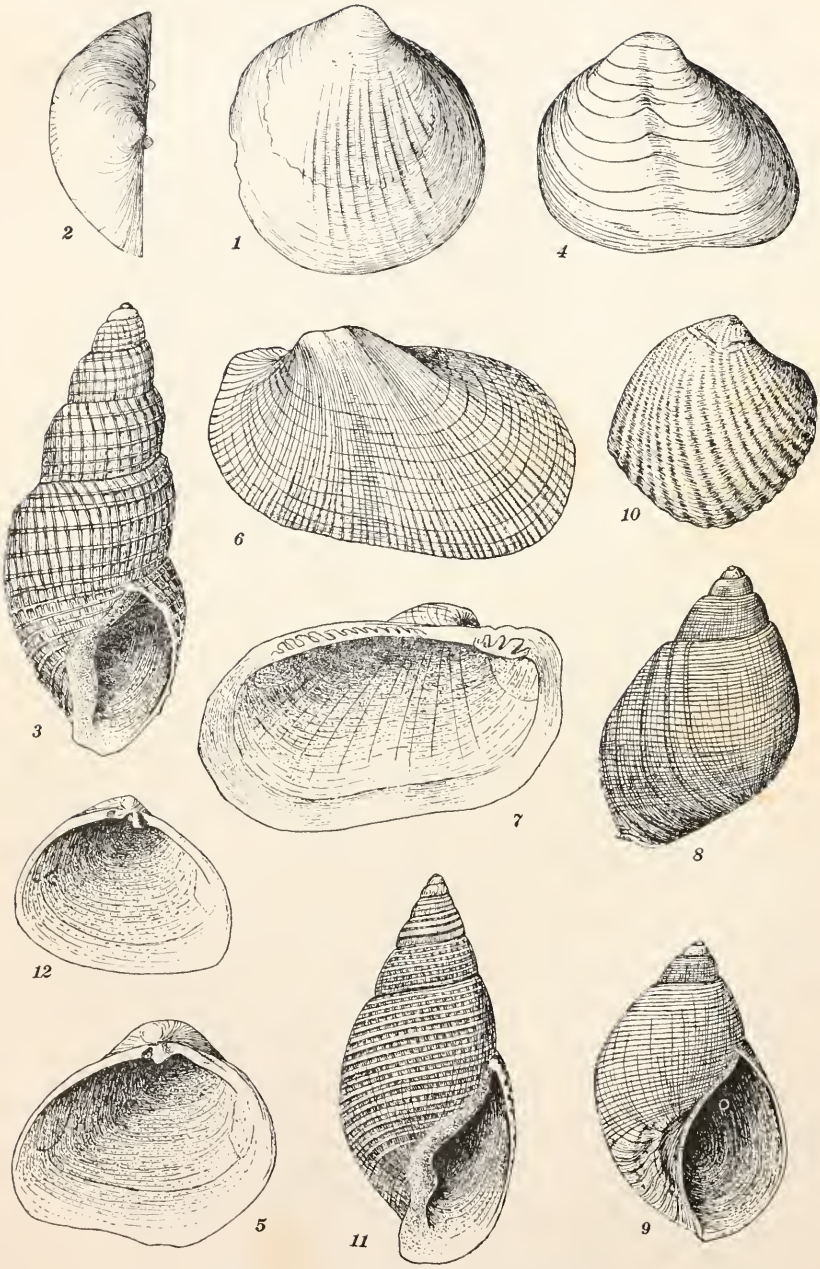
It had swooped down and poked its bill into the open shell of a mussel, which suddenly closed on the bill of the bird. There the the two remained, until the incoming tide drowned the bird. Hundreds have viewed the singular sight today.—(*Boston Globe*).

MARTYN'S UNIVERSAL CONCHOLOGY.—In the course of his very instructive paper on "Thomas Martyn and the Universal Conchologist," in the Proc. U. S. N. M., xxix, 1905, Dr. William H. Dall writes as follows (p. 425), "I am not aware of any other copies of the "Universal Conchologist" in America than the one I have described [a copy in the U. S. National Museum comprising the first eighty plates] and a similar copy in the Academy of Natural Sciences, Philadelphia. Later in his "Supplementary Notes, etc.," in the same Proceedings, vol. xxxiii, 1907, p. 185, Dr. Dall describes a third copy in the possession of Mr. John B. Henderson, Jr., of Washington, likewise consisting of eighty plates, "elegantly bound."

It may be of interest to readers of THE NAUTILUS, especially those residing on the Pacific Coast, to know that there is a fourth copy of this rare work in the library of the Leland Stanford Junior University. This copy comprises all four volumes of the work, including beautiful impressions of the entire 161 plates, and is complete save for the explanatory table for the plates of the third volume. The series was the gift of Mr. Timothy Hopkins, and in this case, also, each volume is "elegantly bound." A copy of the prospectus of the work, similar to the one described by Dr. Dall is laid into the first volume. Beyond this the copy agrees very well with those already described by Dr. Dall. S. S. BERRY.

HELIX ARBUSTORUM var. ROSEOLABIATA.—The var. *roseolabiata*, described as new by Mr. Schlesh in NAUTILUS, October, p. 55, is var. *roseolabiata* Roberts, described from the British Islands many years ago. T. D. A. COCKERELL.

MR. J. H. FERRISS, who has been getting snails, ferns and health in the Chiricahua range, Arizona, expects to return about November 15th. He has not yet turned up the *multicornis*—a shell reported to be as big as a tin-cup, with horns—but he has found many other good things.



ALDRICH: NEW EOCENE MOLLUSCA.

THE NAUTILUS.

VOL. XXII. DECEMBER, 1908. No. 8.

A NEW HAWAIIAN KALIELLA.

BY H. A. PILSBRY AND E. G. VANATTA.

KALIELLA GAETANOI n. sp. Fig. 1.

The shell is perforate, thin, cream-white (the specimens being fossil). Spire straightly conic, the apex rather obtuse. First 1½ whorls white, smooth and convex; following whorls are flattened, finely, rather weakly and irregularly striate radially, the base being irregularly radially striate, with fine microscopic engraved spiral lines. Whorls 5½, very slowly widening, the last acutely carinate, this carina showing immediately above the suture as a narrow seam. The base is convex. The aperture is narrow, truncate at the ends, basal and parietal margins parallel. Columellar margin is short, subvertical, with the edge narrowly expanded.

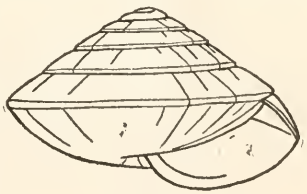


FIG. 1.

Alt. 2.87; diam. 4.84 mm.

Palihoukapapa, Hawaii, fossil. Type No. 95779 A. N. S. P., from No. 4730 of Mr. D. Thaanum's collection.

Kaliella subtilissima (Gld.) and *K. konaensis* Sykes are both less elevated species, otherwise related. Named for the discoverer of the Hawaiian Islands.

NEW EOCENE FOSSILS FROM ALABAMA AND MISSISSIPPI.

BY T. H. ALDRICH.

KELLIA INTERSTRIATA n. sp. Pl. v, figs. 1, 2.

Shell orbicular, slightly inequilateral, very much the shape of a tumid *Diplodonta*, surface smooth except in the medial part where it is distinctly striated. These striae are rather coarse, extending to the basal margin, but they stop at the umbo. Beaks rounded, fairly prominent, pointing inward, and terminate directly above one of the semi-laterals; no lunule. Dentition normal. Length, breadth and thickness about 5 mm.

LOCALITY. Enterprise, Miss. Top of Burrstone.

REMARKS: This shell has the general shape and outline of *K. suborbicularis*, Mont., also a similar dentition. It is peculiar in carrying the medial striations.

Kellia prima Aldr. is a Bornia according to Prof. W. H. Dall.

CANCELLARIA? SOTOENSIS n. sp. Pl. v. fig. 3.

Shell small, whorls about seven, the first two and a half embryonic and smooth, the cancellation beginning on the second half of the third whorl: the remaining whorls strongly cancellated, the body whorl contains 12 spiral lines, while the longitudinals are nearly three times as many; slightly nodular at the intersection points, suture very deep. Whorls strongly rounded. Base somewhat rounded. Aperture oblong, outer lip denticulated within, inner lip rather twisted, and carrying a small fold near the base. Umbilicus not entirely closed.

Length 8 mm.; width body whorl 3 mm.

LOCALITY. De Soto, Miss. Claibornian.

REMARKS: This little shell is more slender in shape than the drawing shows, and the suture is much more deeply impressed. It has somewhat the aspect of a *Scala*.

CORBULA CLARKEANA n. sp. Pl. v, figs. 4, 5.

Shell small, medium thickness, valves moderately inflated. Beaks not very prominent, polished, a groove running from beaks to base in the largest specimens, nearly in the middle of the shell. Valves marked with a few impressed lines of growth wide apart; the outer

surface having a polished look; smooth internally, cardinal tooth large, projecting.

Lon. 3½ mm.; alt. 3 mm.

LOCALITY. Wood's Bluff, Ala.

REMARKS: This little shell differs from any Corbula known to the writer by its polished appearance, and its few impressed lines, rare. One small valve does not have any depression running from beak to base, but is quite regularly rounded.

ARCA (BARBATIA) LIGNITIFERA n. sp. Pl. v, figs. 6, 7.

Shell small, thin, extremities rounded, moderately convex, beaks small and flattened; surface marked by many radial riblets crossed by irregularly spaced lines of growth; a depressed area running from beaks to base nearly central; valves smooth internally, but showing faint lines corresponding to some of the riblets. Hinge line long, slightly curved; the hinge carries four close-set teeth anteriorly, next a short vacant space, and then ten to thirteen small teeth, larger and more nearly parallel to the hinge line as they approach the posterior.

Lon. 5 mm.; alt. 3 mm.

LOCALITY. Six miles east of Thomasville, Ala., Wood's Bluff horizon.

SIGARETUS (EUNATICINA) ERECTOIDES n. sp. Pl. v, figs. 8, 9.

Shell small, thin, whorls five rapidly enlarging, apex somewhat twisted; the first two whorls smooth, the others covered with very numerous fine raised lines which become coarser on the body whorl. Aperture oblong, nearly twice as long as broad; outer lip slightly thickened; umbilicus channeled, and slightly open.

Lon. 6½ mm.; diam. 4 mm.

LOCALITY. De Soto, Miss., Claibornian.

REMARKS: This little shell has very much the form of a small *Succinea*, and resembles in miniature the living forms of the subgenus.

VERTICORDIA (HALIRIS) GRANULOIDES n. sp. Pl. v, fig. 10.

Shell small, rather rotund, surface with numerous rounded ribs, about nineteen in the type; they are granulated under a glass, and rather scabrous between the ribs, especially on the anterior. Posterior slope slightly angulated; basal margin crenulated. The ribs

also show through the body of the shell. Beak small and smooth, the cardinal tooth strongly projecting.

Lon. 2½ mm.; alt. 2½ mm.

Locality. Wood's Bluff, Ala.

Remarks: This species is mentioned by Prof. Dall as *Verticordia* sp. indet. The description is made from a good specimen found by the writer. The shell is rather small for even this genus.

Acteon pomilius *Con.*, var. multannulatus. n. var. Pl. v. fig. 11.

The specimen here figured differs from the typical form by having much more numerous raised lines with shallower interspaces. The spire is higher and the shell more slender. The *Acteon* found by me at Wood's Bluff is different from the form figured by Prof. G. D. Harris, not having any smooth space on the body-whorl. These so-called species appear to belong in one basket.

Height 9 mm.; diam. 6 mm.

Locality. Six miles east of Thomasville, Ala., Wood's Bluff beds.

Lepton vaughani n. sp. Pl. V, fig. 12.

Shell small, surface smooth and shining; lines of growth very fine, shell rather triangular in shape, longer than high; slightly inequilateral. Muscular scars showing, the posterior one rather long and narrow.

Long. 3 mm.; alt. 2 mm.

Locality. Wood's Bluff, Ala.

Remarks: This species seems to be an undoubted member of this genus, as it has the proper dentition; some specimens are equilateral. Named in honor of T. Wayland Vaughn of the U. S. Geological Survey. This seems to be the first *Lepton* found in the Eocene.

NEW LAND SHELLS FROM ARIZONA AND NEW MEXICO.

BY GEO. H. CLAPP.

Bifidaria (*Chænaxis*) *tuba subsp. intuscostata.*

Differs from the type, externally, by its larger size, length 4, diam. 2 mm. and the greater number of whorls, 6½. The smallest normal

shell measured is $3\frac{1}{4}$ x $1\frac{4}{5}$ mm. with about $5\frac{1}{2}$ whorls, and the largest $4\frac{1}{5}$ x 2 mm. with $6\frac{3}{4}$ whorls. Internally there is a strong lamella on the columella, which can only be seen by breaking the shell, *about 2 whorls long* in fully adult shells. Examination of a large number of shells of all ages shows that this lamella is a mark of maturity, as it does not appear until after the angular, parietal and outer columellar lamellæ have begun to form.

The arrangement and number of the other lamellæ and plicæ are the same as in the type, with the usual variation as to extra denticles, ordinarily seen in *Bifidaria*. The body whorl is decidedly angular at the umbilicus, and flattened below the periphery.

Foothills of the Plumosa Range, about eight miles east of Quartzsite, Yuma county, Arizona, in drift. Collected by Mr. Geo. S. Hutson.

Type No. 5769 of my collection. Cotypes in Academy Natural Sciences, Philadelphia, and U. S. National Museum.

In the peck or more of drift from which these shells were picked, there were only two other species, *Bifidaria hordeacella* Pils. and *Pupoides marginatus* (Say), with not even a fragment of anything else.

In the Eagle Tail Mountains, twelve miles north of Kofa, Yuma county, at an altitude of about 2,000 feet, Mr. Hutson found a form which is apparently intermediate between the type and *intuscostata*, in that the columellar lamella is weaker and does not extend in so far. This is probably the form referred to by Pilsbry in Proc. A. N. S., 1906, page 146, taken by the late Dr. Ashmun at Tempé, Maricopa county. The habitat given by Hutson is: "In moist places among piles of loose rock covered by decaying cactus. Associated with these were also *Bif. hordeacella* and *P. marginatus*.

The finding of this species in Cochise, Maricopa and Yuma counties, shows a distribution of *B. tuba* clear across the territory.

ASHMUNELLA KOCHII n. sp.

Shell very much depressed, almost flat above, convex below, carinated, the carina about in the plane of the upper surface; sutures well impressed, whorls $5\frac{1}{2}$; surface almost smooth, with faint and closely-set incremental lines; nuclear whorl and a half finely granulated; base convex, flattened around the umbilical region; umbilicus deep, about $1\frac{1}{4}$ mm. wide, showing a full turn of the penultimate

whorl, termination of the body-whorl sharply descending at the aperture to about the middle of the whorl. Aperture very oblique; lip obtusely angled and almost perpendicular below the middle of the whorl; strongly constricted behind the reflected lip; peristome well expanded above, narrower below, somewhat flexuous, united over the body by a thin callus; parietal lamellæ two, converging, but not united at the inner end into a V; the lower lamella stout, sinuous, the outer end bent sharply towards the umbilicus; the upper lamella low, narrow and straight, starting near the upper insertion of the lip and terminating back of the front end of the lower lamella; basal part of the peristome with two strong lamellæ transverse to the lip, the upper ends converging and united at the base on the lip, forming a U; a broader and less transverse lamella set more deeply within the aperture on the upper lip, a small internal lamella on the base of the body whorl about three or four mm. long, showing faintly through the shell.

Greater diameter $20\frac{1}{2}$, lesser 18, alt. $6\frac{3}{4}$ mm. Black Mountain, at the southern end of the San Andreas Range, Donna Ana county, New Mexico, at an elevation of about 6,800 feet.

This interesting shell was first collected by Mr. Walter E. Koch over a year ago. He sent me one perfect and one broken shell. Lately he has sent me three additional specimens, also dead. He reports dead shells quite plentiful in the crevices of a limestone cliff, but was unable to find living ones. I take great pleasure in naming the shell after him.

Type no. 5765 of my collection.

A. kochii is undoubtedly closely related to *A. mearnsii*, but is very much larger, more strongly carinated, and differs markedly in the umbilical region.

Both of these species will be figured on plate VI, to appear next month.

NOTES ON THE GENUS STROBILOPS.

BY HENRY A. PILSBRY.

The small forest-snails known as *Strobilops* are spread throughout all parts of North America east of the Rockies where sylvan conditions prevail, from Canada to Florida, Mexico and Central America.

Southward the genus extends to Venezuela, and even to the Galapagos Islands, if I am right in referring the little snail described as *Endodonta helleri* Dall to this genus.

For many years similar snails have been known from the European Tertiaries, beginning with the Eocene and running up with numerous species through the Miocene, when the group apparently died out in that region, though many of its companion groups survived.[1]

Père Heude, the keen and brilliant Jesuit missionary-naturalist, described the first Asiatic *Strobilops*, in his memoirs on Chinese snails, under the name *Helix diodontina*. He did not recognize its kinship with other forms of *Strobilops*, nor has this been noticed by any other author until the present year, when the receipt of specimens of a *Strobilops* from Korea gave occasion for referring the Chinese *H. diodontina* to its proper genus. The Korean species, which I have decribed as *Strobilops hirasei*,[2] is conic, like most American species, but it is simply striate instead of being ribbed. Quite lately a third Asiatic species has been sent by Mr. Hirase, discovered in the main island of Japan. It will be described in the Japanese *Conchological Magazine*. The finding of three species, in China, Korea and Japan, indicates Eastern Asia as another evolution-center for species of *Strobilops*. Probably still more will turn up there as the country is further explored.

But this is not all. Several years ago Dr. O. von Moellendorff described several small snails from the Philippine Islands under the generic name *Plectopylis: P. quadrasi* with a variety *brunnescens* from Luzon, and *P. trochospira* from Bohol. In his able and exhaustive work on *Plectopylis*,[3] Mr. G. K. Gude has erected a subgenus *Enteroplax* for these species, rightly holding that they differ markedly from true *Plectopylis*. In reality, these Philippine snails are nothing more or less than *Strobilops*, having the form, sculpture, peristome and internal armature of this genus, the entering lamellæ or cords on the parietal wall being minutely nodose, as in American and East Asiatic *Strobilops*. These Philippine species will stand as *Strobilops quadrasi* (Mlldff.) and *Strobilops trochospira* (Mlldff.).

[1] The identification of *S. labyrinthica* as a European fossil, recorded in Woodward's Manual and copied in some American works, is erroneous. The foreign species is quite distinct.

[2] The Magazine of Conchology, II, p. 39, figs. Y. Hirase, Kyoto, 1908.

[3] The Armature of Helicoid Land Shells, Science Gossip, 1899, p. 149.

As to the place of origin of *Strobilops* we have no reliable data. The presence of typical forms of the genus in the Eocene shows that the group is a very old one, evolved in the Mesozoic. It is, moreover, strikingly distinct from all other genera, and wonderfully conservative in general morphology. Until information from Mesozoic strata comes to hand, we can only surmise with some probability that *Strobilops* arose somewhere in the northern hemisphere. It probably overran the entire Holarctic realm a long time ago, pushing southward into the Oriental region and the American tropics at a time remote enough to permit the evolution of strongly marked species in these areas.

ANOTHER LARGE MIOCENE SCALA.

BY W. H. DALL.

Mr. W. W. Atwood of the U. S. Geological Survey has been making a study of the Miocene strata of Alaska Peninsula and the Shumagin Islands during the past summer, and collected a number of interesting fossils. Among these is a specimen of a species of *Scala*, or *Epitonium*, belonging to the group of giant Scalidae which is so characteristic of the Miocene of Oregon and some other parts of the Pacific coast. The list comprised the following species already described and figured.

Opalia rugifera Dall,
Arctoscala condoni Dall,
Catenoscala oregonensis Dall;

together with the species about to be described. The type of *Arctoscala* is *A. greenlandica* Perry, a recent species. *Opalia rugifera* is a member of the group represented in the San Diego Pliocene by *O. varicostata* Stearns, and in the recent fauna by *O. borealis* Gould. *Catenoscala* is a new group in which the anterior third of the whorl is covered with a thick layer of enamel.

Epitonium (*Acrilla*) *atwoodi* n. sp.

Shell large, with rotund whorls rapidly increasing in size; surface covered with a low reticulate sculpture comprising low axial lamellæ, about 1.5 mm. apart on the periphery of the whorls, slightly

retractive, pinched together and more prominent, and slightly angularly bent, at the suture; these are crossed by low rounded threads, with wider interspaces, about a dozen on the penultimate whorl between the sutures; the surface is also finely sharply axially striate; the aperture is rounded, the outer lip slightly reflected and crenulate by the spiral threads, but not thickened; whorls more than five, closely adjacent; base (?); max. diam. 34; diam. at the truncate apex 10.0; alt. of five whorls (the apex lost) about 60.0 mm.

The type specimen of this fine species, consisting of internal and external casts, was collected about five miles south of the head of Port Moller, in the pass leading across Alaska Peninsula called Low Pass Cañon, U. S. Nat. Mus. 111072. Illustrations are in preparation.

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DESCRIPTION OF A MEXICAN LAMPSILIS.

BY H. A. PILSBRY AND L. S. FRIERSON.

Lampsilis iridella P. & F.

The shell is oblong, wider posteriorly, with the beaks at the anterior two-ninths of the length; anterior end rounded; posterior part sloping above, subtruncate at the end, compressed below the hinge. Surface glossy, smoothish, obliquely corrugated along the posterior slope (but sometimes very indistinctly so), and usually having a group of short impressed lines or furrows vertical to the basal margin, near the middle of the disk. Of a dull straw or pale greenish color, profusely marked with green rays, which are usually quite distinct and narrow. The valves are thin, nacre bluish silvery, very iridescent posteriorly. Cardinal teeth small, a single rather stout one in the right valve, two more compressed and generally subequal teeth in the left valve. Lateral teeth very narrow, double in the left, single in the right valve.

Length 49, alt. 26, diam. 15 mm.

Valles, Mexico. Type no. 93810 A. N. S. P., collected by Mr. A. A. Hinkley. Cotypes in collections of Hinkley and Frierson.

L. iridella, NAUTILUS, XXII, no. 8, pl. 12, two lower right hand figs.

This species was decided to be new when we studied Mr. Hinkley's Mexican shells in 1907, and so indicated in correspondence between the authors and Mr. Hinkley. It was figured as *Lampsilis iridella* in this journal for December, 1907. It is related to *V. popei* and *U. medellinus* (see NAUTILUS, Nov., 1907, p. 80).

In this connection attention may be called to the newly-described *Lampsilis salinasensis* Simpson, in Dall, Proc. U. S. Nat. Mus., 1908, p. 181, pl. 30, f. 3, type loc., Salinas River, Coahuila, also reported from Valles River, Valles, Mexico. This form is closely related to *L. fimbriata* Frierson, from the same place, figured on the same plate of the NAUTILUS with *L. iridella.*

NOTES.

A NOTE ON THE TYPE LOCALITY OF PALUDESTRINA SALSA, AT COHASSET, MASS.—The largest and finest specimens were found on rocks and eel-grass in about a foot of water and not more than three hundred yards from where the creek empties into Cohasset harbor. A dam and tide gates over which the salt water flows for only one or two hours at the top of each tide prevent the water at the spot where the shells were found from being as salty as one would expect, while a considerable amount of fresh water received by the upper part of the creek flows out on top of the salt water without mixing with it completely. Therefore the surface water is only brackish, not salt, and forms every winter very good black ice almost to the dam. Specimens were also found on floating plants about a mile further up the creek where the water has practically no salt in it. Dr. Pilsbry had specimens from both localities at the time he described the species.—OWEN BRYANT.

VALVATA HUMERALIS CALIFORNICA n. subsp. The shell is much more depressed than *V. humeralis*, the last whorl descending less; whorls convex below the suture, not flattened there as *V. humeralis* is. Alt. 2.7, diam. 4 mm. Bear Lake, San Bernardino Mts., California, collected by Mr. S. S. Berry.—H. A. PILSBRY.

HERON HELD PRISONER BY CLAM. BLOOMSBURG, PA.—Walk-

ing along the river at Beach Haven, Augustus Remaley saw a fine specimen of blue heron evidently unable to fly. Attracted by the beautiful bird's distress, he discovered that a clam or fresh water mussel had closed tightly about one of the bird's toes and held it so securely that it could not get away. In the bird's mouth was a small fish.—*N. Y. Herald, Aug. 16, 1908.*

Type of Ampulla Bolten.—This name, proposed in the Museum Boltenianum p. 110, for species of *Achatina*, *Limicolaria* and *Halia*, evidently has precedence for some part of this assemblage. I propose to restrict it to the last genus, *Ampulla priamus* Bolt. being the type.—H. A. Pilsbry.

The development of Littorina.—"The eggs of *L. litorea*, each enclosed in a hat-shaped capsule, are laid freely on the shore, not aggregated together in a gelatinous mass. There are trochosphere and veliger stages. *L. litorea* lives down in the zone of Laminaria and *Fucus serratus*. *L. obtusata* lives higher among *Fucus vesiculosus*; its larva leaves the egg as a veliger. *L. rudis* and *L. neritoides*, which live near high-water mark, are both viviparous. Thus the genus exhibits three stages in the evolution of the land from marine mollusca, with the suppression of larval forms with successive specialisations of habit."—M. M. Tattersall, M. Sc., in The Irish Naturalist, Nov. 1908, p. 238.

PUBLICATIONS RECEIVED.

Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California * * * by the U. S. Fish Commission Steamer "Albatross" during 1891. Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, etc., "Albatross," 1904–'05. By William Healey Dall. Bull. Mus. Comp. Zool. xliii, no. 6, October, 1908.

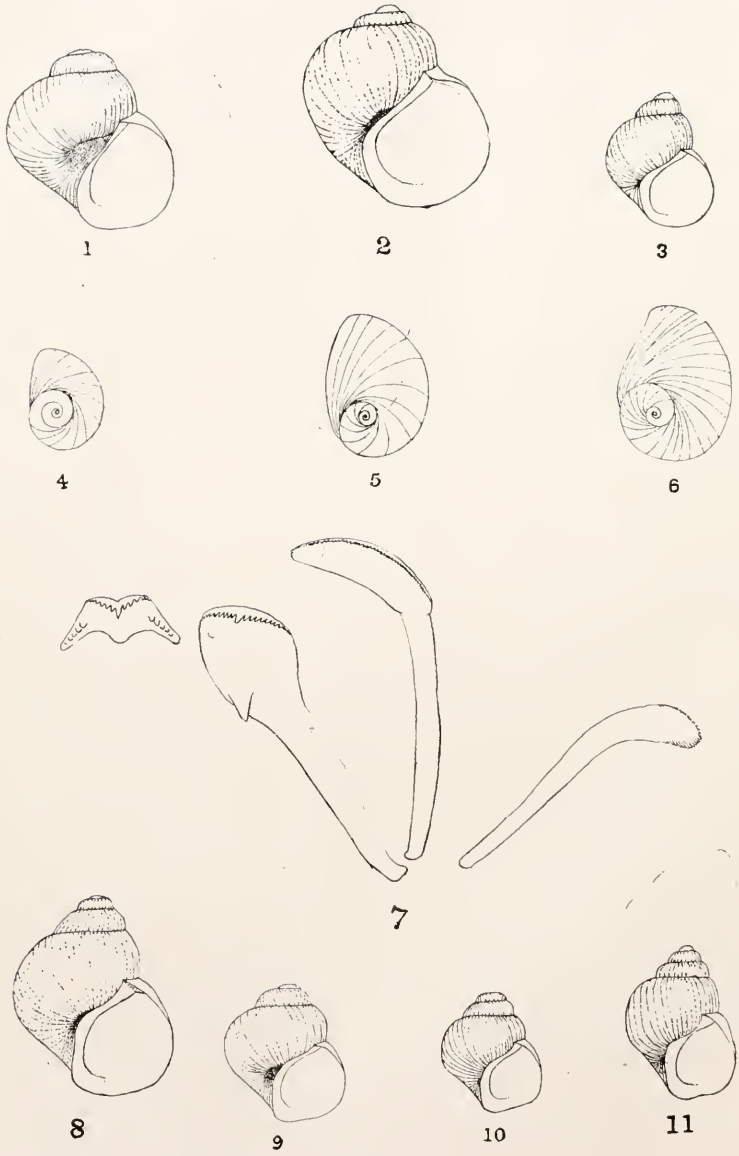
The dredging operations of the "Challenger," "Blake" and "Albatross" have made us reasonably familiar with the deep water fauna of the western Atlantic, Caribbean Sea and Gulf, but hitherto practically nothing has been known of the deep water fauna off the west-

ern shores of Middle and South America, with which this Report deals. A comparison of the two faunas reveals many interesting facts. The known fauna of the eastern Pacific deep sea contains about 300 species of mollusks, belonging to 134 generic and subgeneric groups. The Antillean region possesses 174 groups and a much larger number of species. "There are practically no species common to the two regions except at the southern extreme of South America, where a few species extend northward on both shores of the continent, but do not reach the Antillean or Panamic regions."

The 300 species known from the Eastern Pacific deep sea fauna belong to 67 families, but 159 of them belong to only 8 families, of which the *Turritidæ* or *Pleurotomidæ* (57species), *Ledidæ* (35 species), *Dentaliidæ and Pectinidæ* are the most abundantly represented. The Antillean deep water fauna has 174 generic and subgeneric groups, against 144 in the Pacific, but of this number only 89 are common to the two regions. Very many characteristic and prolific groups in either fauna are unrepresented in the other. "These statistics would indicate, if confirmed by further researches, that the separation between the abyssal fauna of the Pacific and that of the Antilles is very ancient indeed, for in the shallows many of these groups are represented on both sides of the isthmus of Darien, yet have not yet succeeded in reaching the deep water." The total absence of *Triphoridæ*, *Cerithiopsidæ*, *Marginellidæ* and *Pyramidellidæ* in deep water on the Pacific side is especially remarkable.

Some 254 new species of mollusca are described. A very useful synopsis of the recent species and subspecies of *Argonauta* is given, 8 species being recognized. Much new and interesting material for the systematic student is given, especially in the *Terebridæ*, *Turritidæ*, *Solemyacidæ*, etc., and as in all of Dr. Dall's papers, there is a large store of information of value far beyond the limits of the particular fauna under consideration. The changes in nomenclature consequent on the resurrection of Bolten's Catalogue, are numerous, and important to those engaged in similar work. Several lists are appended, of interest to those engaged in faunistics: shells from the reefs and beaches of Easter Island and of Flint Island; and a single valve of a Pisidium, *Corneocyclas magellanicus* n. sp., was taken in Magellan Straits, evidently washed in from some adjacent stream.

As the pioneer work in a new fauna, this scholarly report will be welcomed by conchologists the world over.



WALKER: NEW SPECIES OF SOMATOGYRUS AND CLAPPIA.

The Nautilus.

Vol. XXII. JANUARY, 1909. No. 9.

NEW AMNICOLIDÆ FROM ALABAMA.

BY BRYANT WALKER.

In the fall of 1907 Mr. Herbert H. Smith explored about twenty-five miles of the Coosa River, lying between Chilton and Coosa counties. *Amnicolidæ* were very abundant, and more than 15,000 specimens have been passed under examination. Among them were the several species herein described, which appear to be new.

The principal collecting points were Cedar Island, three miles above Waxahatchee Creek (in The Nautilus, xxi, p. 128, this island was erroneously stated to be that distance above Yellowleaf Creek); The Bar, two miles further down stream, and two and one-half miles above Yellowleaf Creek (the second creek of that name); Butting Ram Shoals, five miles below The Bar; Higgins Ferry, seven miles further down; and Duncan Riffle, seven miles below the Ferry. Duncan Riffle is about twenty-four miles above Wetumpka. This interval still remains for some enterprising collector to explore.

All of the Coosa River species collected by Hinkley were also found by Smith, with the exception of *Som. aureus*. *S. hinkleyi*, *crassus* and *nanus* occurred in great quantity, the latter being the most numerous. *S. coosaensis*, *obtusus* and *aldrichi* were less abundant, but were fairly common in some localities. *S. constrictus* still remains the rarest of the Coosan *Somatogyri*, a bare half-dozen representing the total catch. An interesting "find" was that of *S. substriatus*, originally collected by Hinkley at Florence, Ala., and Columbus, Miss.

As none of the *Amnicolidæ* collected by Mr. Smith in his journey

by boat down the Coosa from Rome, Ga., to Widuska Shoals, Shelby county, Ala., in 1904–5, have been worked up, it is not at present possible to say how far up the river any of these species extend.

SOMATOGYRUS DECIPIENS n. sp. Pl. vi, figs. 10 and 11.

Shell obtusely conic, imperforate, thick, solid, light greenish-yellow, smooth, lines of growth very fine and inconspicuous. Spire elevated, obtuse; whorls 4, roundly shouldered below the suture, which is well impressed; body whorl large, shouldered above, flattened on the sides and obliquely angled below and descending to the axis. Aperture very oblique, obovate, obtusely angled above and widening toward the base, which is slightly emarginate. Columella concave, with a heavy, wide, flattened callus which extends over the parietal wall. Lip sharp, heavily thickened within.

Alt. (fig. 11) (apex eroded) $3\frac{1}{2}$, diam. $2\frac{1}{2}$ mm.

Types (No. 28431, Coll. Walker) from the Coosa River at The Bar, Chilton county, Ala. Co-types in the collections of T. H. Aldrich, G. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy. Also from the Coosa at Cedar Island, Butting Ram Shoals, Higgins Ferry, Duncan Riffle and other points in Coosa and Chilton counties, collected by Smith, and from the Coosa at Wetumpka, five miles above Wetumpka, Wilsonville, Fort William, and Montevallo, collected by Hinkley.

A careful study of many hundreds of specimens has convinced me that under the description of *Somatogyrus hinkleyi* (NAUTILUS, xxii, p. 135) I confounded two distinct species, one imperforate, and the other perforate. As both the figured types of *hinkleyi* fortunately belong to the same form, the perforate one, that species will retain the name under the amended description given below. The imperforate form is the species here described as *decipiens*. The distinctive characters of the two species are so marked that, once appreciated, there is no difficulty in separating them at sight, and it is a matter of some chagrin that the difference was not realized in the first instance.

S. decipiens is a smaller, thicker species than *hinkleyi*, and always imperforate, without any suggestion of an axial groove. While both species are alike in the elevation of the spire, *decipiens* is at all stages of growth distinctly biangulate, with the intervening side of the whorl flattened; in some instances the lower angulation becomes a distinct carina, but this is not usual.

For comparison with the similar state in *S. hinkleyi*, a young specimen of $3\frac{1}{2}$ whorls ($2\frac{1}{4}$ x $1\frac{1}{2}$ mm.) is also figured. (Fig. 10.)

The following amended description should be substituted for that originally published for

SOMATOGYRUS HINKLEYI Walker. Pl. vi, figs. 8 and 9.

Somatogyrus hinkleyi Walker, NAUTILUS, xvii, 135, pl. v, figs. 1 and 2.

Shell globose, conic, narrowly umbilicate when young and perforate when mature; light horn-colored, smooth, growth-lines scarcely evident. Spire elevated, obtuse; whorls 4–$4\frac{1}{2}$, those of the spire convex, body whorl large, more or less shouldered above, but regularly rounded at the periphery, suture deeply impressed. Aperture large, rounded above, somewhat flattened at the base, and decidedly angled at the junction of the lip with the base of the columella, and angular at the upper insertion of the lip; lip simple, acute, in aged examples somewhat thickened within. Columella heavy, callused, flattened and nearly straight, reflected over and nearly concealing the narrow umbilicus, callus thinner on the body wall.

For better illustration and comparison with *S. decipiens* I have refigured the original mature type (fig. 8) and have added another of a young shell (fig. 9) of $3\frac{1}{2}$ whorls ($2\frac{1}{2}$ x 2 mm.) for the purpose of showing the open umbilicus at that stage; the thin, shining shell and rounded whorls are very characteristic.

S. hinkleyi, when mature, has a larger, thinner shell than *decipiens*, the columellar callus is not so heavy, and the persistent perforation, very rarely entirely obliterated, as well as the general shape, are distinctive.

This species was found by Mr. Smith at the localities mentioned in connection with *S. decipiens*.

SOMATOGYRUS HENDERSONI n. sp. Pl. vi, fig. 2.

Shell globose, perforate, thick, solid, greenish-horn-color, smooth, lines of growth slight, but regular. Spire short, subacute, whorls 4–$4\frac{1}{2}$, flattened above, and roundly shouldered, body-whorl very large, inflated, somewhat constricted immediately below the suture, which is deeply impressed and then flatly expanded and roundly shouldered. Aperture large, subcircular, expanded; lip sharp, callously thickened within, rather abruptly bent in above and meeting the parietal wall at nearly a right angle, broadly rounded below and

curving regularly into the columella. Columella narrow, thickened, rounded and concave, separated below from the body-whorl by a small but profound umbilicus and a strong axial groove, adnate only on the parietal wall, which is heavily callused. Alt. (apex eroded) 4.5, diam. 4.5 mm.

Types (No. 28432, Coll. Walker) from Coosa River at Duncan's Riffle, Chilton County, Ala. Co-types in the collections of T. H. Aldrich, G. H. Clapp, J. B. Henderson, Jr., and the Philadelphia Academy. Also from the Coosa at Wilsonville, Ala.

This species is about the size and general appearance of *S. depressus* Tryon, and *sargenti* Pils. It differs from the former in its heavier shell, sub-sutural constriction, large umbilicus and strong axial groove. The latter species is rather larger, not so thick and imperforate. A single specimen from Williamsville was recently sent in by Mr. Hinkley, which was not included in the material sent to me in 1904.

Named in honor of Mr. J. B. Henderson, Jr., who has been a hearty supporter of Mr. Smith's work on the Coosa.

SOMATOGYRUS PYGMÆUS n. sp. Pl. vi, fig. 3.

Shell minute, globose-conic, imperforate, rather thin, light greenish horn-colored, smooth, lines of growth indistinct. Spire obtusely elevated, whorls 4, convex, suture deeply impressed; body whorl large, convex, regularly rounded, impressed at the axis. Aperture subcircular, not much expanded. Lip simple, sharp, thin, regularly curved from the upper to the columellar extremity. Columella concave. Columellar callus narrow, flattened, closely appressed to the body whorl and extended over the parietal wall to the upper insertion of the lip.

Alt. (apex eroded) 2.5, diam. 2 mm.

Types (No. 28433, Coll. Walker) from the Coosa River, at The Bar, Chilton county, Alabama. Co-types in the collections of T. H. Aldrich, G. H. Clapp, J. B. Henderson, Jr., and the Philadelphia Academy.

About twenty-five examples of this diminutive species were collected at The Bar. It did not occur elsewhere. I have been wholly unable to identify this form as the young of any of the associated species. Though so small, the shells have every appearance of maturity. Compared with young *S. nanus* of the same size, *pygmæus* differs in the thinner shell, regular convexity of the whorls and

lighter columellar callus. It is easily distinguished from other described species by its size.

CLAPPIA, n. gen.

Shell small, globose-turbinate, narrowly, but deeper *umbilicate*, aperture large, lip simple, *columellar lip simple*, adnate to body-whorl only at the extreme upper portion, oblique, expanded and subangulate to its union with the basal lip, operculum corneus, paucispiral, *nuclear whorls large and subcircular, slowly and gradually increasing.*

Rachidian tooth of the radula short and broad; intermediate tooth with sub-quadrate body with a strong tooth projecting from the infero-anterior angle and a large peduncle; laterals multicuspid: Formula of the denticles: $\frac{6-1-6}{4-4}$ 10–1–10, 50+, 50+ (Fig. 7).

Type: *Clappia clappi* Walker.

This genus stands close to *Somatogyrus*, but differs in several important particulars, which forbid the reference of the type species to that group.

The central tooth of the radula is very similar both in shape and in the arrangement and number of the denticles to that of *S. depressus* as figured by Stimpson. But the intermediate tooth lacks the perforation, which is found in that species, and has a prominent tooth at the infero-anterior angle which is lacking in the other. The laterals are multicuspid. In this respect, *Clappia* stands in the same relation to *Somatogyrus* that *Cincinnatia* does to *Amnicola.*

In shell characters, *Clappia* differs from *Somatogyrus* in the conspicuous deep umbilicus, the straight, thin inner lip without any callus thickening, which is entirely separate from the body whorl, except for a very short distance at the upper extremity.

The operculum is also very different. In all the species of *Somatogyrus* examined, the nuclear whorls of the operculum are very small, while the last is enormously expanded (see Fig. 6, *S. subglobosus*, Fig. 5, *S. depressus*). In *Clappia* (Fig. 4), on the other hand, the nuclear whorls are large and nearly circular, and form nearly one-half of the whole operculum. Indeed, in looking at the operculum *in situ*, the first impression is that it is completely circular as in *Valvata.*

CLAPPIA CLAPPI n. sp. Pl. vi, figs. 1, 4 and 7.

Shell small, globose-turbinate, narrowly and deeply umbilicate;

rather thin, translucent, pale horn-color, smooth, shining, lines of growth very fine, close and regular; spire obtuse. Whorls $3\frac{1}{2}$, round, very convex, rapidly increasing toward the aperture, separated by a deep suture. Aperture large, slightly oblique, scarcely expanded, subcircular, equally rounded above and below, but flattened on the columellar side. Columellar lip thin, straight, oblique, adnate to the body-whorl only at the upper extremity, emarginate in the central portion, below which it is expanded, forming a rounded angle at its junction with the basal lip. Lip thin, sharp, not expanded nor callously thickened within. Operculum paucispiral, nuclear whorls large and subcircular. Animal black.

Alt. (apex eroded) 3, diam. 3 mm.

Types (No. 28434, Coll. Walker), from the Coosa River at Duncan's Riffle, Chilton County, Ala. Cotypes in the collections of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy. Found also at The Bar, Butting Ram Shoals and Higgins' Ferry.

Deprived of its operculum, this species at first sight, from its general shape, rounded whorls and deep umbilicus, would be taken for a *Valvata* allied to *V. sincera* Say. But the straight columellar lip and the decided projection of the lip at its junction with the peritreme show its affinity to *Somatogyrus*.

The peculiarities of the radula and operculum have been sufficiently stated under the generic description. I am indebted to Dr. Pilsbry for the figure of the dentition. It seems eminently proper that this very distinct addition to the fauna of Alabama should both generically and specifically bear the name of Mr. Geo. H. Clapp, the original promotor of the explorations of Mr. H. H. Smith, which have added so much to our knowledge of the mollusca of that State.

Explanation of Plate VI.

Figures 1, 3, 9 and 10 are on the same scale, x8.

Figures 2, 8 and 11 are x6.

Figs. 1, 4 and 7. *Clappia clappi.* Duncan's Riffle, Coosa R., Ala.

Fig. 2. *Somatogyrus hendersoni.* Duncan's Riffle, Coosa R., Ala.

Fig. 3. *Somatogyrus pygmæus.* The Bar, Coosa R., Ala.

Fig. 5. *Somatogyrus depressus.* Watertown, Wis.

Fig. 6. *Somatogyrus subglobosus.* Big Muddy R., Blairville, Ills.

Fig. 8. *Somatogyrus hinkleyi.* Coosa R., Wetumpka, Ala.

Fig. 9. *Somatogyrus hinkleyi.* Coosa R., The Bar, Ala.

Figs. 10 and 11. *Somatogyrus decipiens.* Coosa R., The Bar, Ala.

THE BREEDING SEASON OF UNIONIDÆ IN PENNSYLVANIA.

BY DR. A. E. ORTMANN.

Since C. T. Simpson published his new system of the *Unionidæ* (Proc. U. S. Nat. Mus. 22, 1900), which is founded, in a large part, upon the "marsupium" of the female, this latter organ must be regarded as one of the most important features of the soft parts of the mussels, and should be known in every species. Yet there is a large number of species, in which it has never been seen by anybody. That certain species are very rarely found with the marsupium developed, is, in my opinion, chiefly due to the fact that they are not easily obtained at the period when they are gravid. As Sterki has first suggested (NAUTILUS, 9, 1895, p. 91), there are *two groups* among our mussels with regard to the period of gravidity[1]: *summer breeders* and *winter breeders*. In the summer breeders the short "breeding season" falls into the early summer months (May, June, July); now since many of the species which belong or may belong here are characteristic for the larger rivers, avoiding smaller streams, and since just at this time the rivers very generally are swollen and muddy by copious summer-rains, it is practically impossible to collect them in the gravid condition.

During the summer of 1908 we had exceptionally dry weather in our region; the stage of the rivers in Pennsylvania was already in the beginning of July very low, and thus the writer succeeded in finding several species in a gravid condition, which generally at that season are out of reach. In addition, he has collected other species in the smaller streams at various seasons, and has found gravid females, both of summer and winter breeders. The following is a list of them, which also intends to give the previous records for those species which are found in Pennsylvania:[2]

[1] In order to avoid misunderstanding, I want to state expressly that by "period of gravidity" or "breeding season" I mean the time when the gills, or part of the gills, which forms the "marsupium," are filled with eggs or embryos.

[2] See: Lea, I; Observations, II, 1838, p. 51 ff.; III, 1842, p. 231; VII, 1860, p. 221; X, 1863, p. 412, etc.; Sterki, V, NAUTILUS, 9, 1895, p. 91; 12, 1898, p. 18; Amer. Natural., 37, 1903, p. 103; Baker, F. C., Bull. Chicago Ac., 3, 1898 (passim); Conner, C. H., NAUTILUS, 21, 1907, p. 87.

GROUP A. WINTER BREEDERS.

Truncilla triquetra Raf. Found gravid by the writer repeatedly in the months of September and October.

Truncilla perplexa rangiana Lea. Winter breeder (Sterki, '95). Found gravid in September.

Micromya fabalis Lea. July–August (Lea, III, '42).

Lampsilis ventricosa Barn. Winter breeder (Sterki, '95); autumn (Lea, III, '42); March, October (Lea, *ibid.*). Found gravid by the writer in all months from May to October. Marsupium partly empty (ovisacs extruded) on May 11; marsupium just beginning to be filled, July 30. (Breeds apparently "all the year round." See below.)

Lampsilis ovata Say. Autumn (Lea, III, '42); November (Lea, X, '63). Found gravid in August, September, October. (This is merely a variety of *L. ventricosa.*)

Lampsilis cariosa Say. October (Lea, II, '38). Found gravid in August.

Lampsilis ochracea Say. June and November (Lea, II, '38).

Lampsilis multiradiata Lea. Autumn (Lea, III, '42); July, August (Lea, *ibid.*). Found gravid in May, June, August, September, October. Only few specimens being found in June and July, it is uncertain whether there is an "interim" in the summer.

Lampsilis luteola Lam. March, July–August, October (Lea, III, '42); July (Baker, '98). I found gravid specimens in April, May, June, July, August, September, October. The species is a typical winter breeder, only the end of one season and the beginning of the next partly overlap in summer. In June, and chiefly in the beginning of July, sterile females (with the marsupium not charged) are much more frequent than in other seasons, while gravid females are very rare at the same time.

Lampsilis radiata Gmel. "All the year round" (Conner, '07); November (Lea, II, '38); May (Lea, X, '63). Discharge of ovisacs observed from November to March (Lea, X, '63).

Lampsilis ligamentina Lam. Winter breeder (Sterki, '95); autumn (Lea, III, '42). Found gravid by the writer in August, September, October, but not in July. Among numerous specimens collected, July 8, '07, July 3, 10 and 13, '08, not a single gravid female was discovered. The earliest date for the latter is August 3, but from that time on they were found regularly. This species pre-

fers the larger rivers, and thus no dates could be secured for the spring months, yet the "interim" in July is very sharply marked.

Lampsilis orbiculata Hildr. Autumn (Lea, III, '42). Found gravid in August and September.

Lampsilis recta Lam. Winter breeder (Sterki, '95); autumn (Lea, '42). Found gravid in July, August, September, October. No records at hand for the early summer.

Lampsilis nasuta Say. "All the year round" (Conner, '07); winter breeder (Sterki, '95); November (Lea, II, '38). I found this species gravid in September (Delaware River), and on June 2 and 3 (in Lake Erie), when numerous gravid females were found.

Lampsilis iris Lea. I found three gravid females on May 11.

Lampsilis parva Barn. Winter breeder (Sterki, '95); May and November (Lea, VII, '60). Extrusion of ovisacs observed by Lea (*ibid.*) in May.

Lampsilis (*Proptera*) *alata* Say. Winter breeder (Sterki, '95); autumn (Lea, III, '42). Found gravid end of August, September, October.

Lampsilis (*Proptera*) *gracilis* Barn. Winter breeder (Sterki, '95); autumn (Lea, II, '42). Found gravid in September.

Obovaria retusa Lam. Autumn (Lea, III, '42). I found a gravid female of this species on August 29, '08.

Obovaria circulus Lea. Winter breeder (Sterki, '95); autumn (Lea, III, 42); March, July–August (Lea, *ibid.*). I found gravid females on May 27, '08. Both forms *O. circulus* and *lens* are included here: they pass into each other.)

Obovaria ellipsis Lea. Winter breeder (Sterki, '95); autumn (Lea, III, '42).

Plagiola securis Lea. Autumn (Lea, III, '42). Gravid females not rare in September and October.

All species mentioned so far possess the "Lampsilis-type" of marsupium, *i. e.*, the posterior part of the outer gills is charged, at the period of gravidity, with eggs or embryos contained in distinct ovisacs. When not gravid, this part of the gills differs in structure from the rest, and females are always recognizable.

Cryptogenia irrorata Lea. Winter breeder (Sterki, '95); autumn (Lea, III, '42).

Marsupium very peculiar, but allied to the Lampsilis-type.

Ptychobranchus phaseolus Hildr. Winter breeder (Sterki, '95);

autumn (Lea, III, '42). Found gravid in August, September, October. A specimen found on May 11, '07, had most of the ovisacs discharged. None of the numerous specimens collected by the writer in June and July were gravid.

The peculiar shape of the marsupium of this species is well known.

In the following species, belonging to Group A, the marsupium occupies the whole of the outer gills, and while in *Strophitus* distinct "placentae" (Sterki) are developed, such structures or ovisacs are not present in the rest.

Strophitus undulatus Say. Autumn (Lea, III, '42); March, October (Lea, *ibid.*); September, December (Lea, II, '38); discharge of placentæ observed in January and February (Lea, X, '63). I found this species gravid in the months of July, August, September, October; also in May. The latest date is May 22, '08 (one out of eleven individuals). Among numerous specimens collected on May 14 and May 27, '08, no gravid females were present, and during the month of June such were never found, although a good number of specimens were collected. The earliest date again is July 11. This gives an "interim" from the end of May to about the middle of July.

The eastern *S. undulatus* Say is absolutely undistinguishable from the so-called *S. edentulus* Say of the western waters.

Anodonta cataracta Say. Breeding season, eight months during the year; the interim May to October (Conner, '07); gravid in October and November (Lea, II, '38). I have seen gravid specimens collected on July 23, '08, and August 21, '08. The first date, no doubt, represents an exceptional case: there was only a single gravid individual among forty to fifty specimens. The other date (also a single individual, but only one found at that date) possibly marks the beginning of the season. At any rate it is very probable that the breeding season occasionally lasts longer than indicated by Conner, and may be extended in individual cases beyond May and may begin earlier than October, as is the case in other winter breeders.

Anodonta imbecillis Say. Autumn (Lea, III, '42); March (Lea, *ibid.*). Found gravid May 21, '08 (outlet of Lake Leboeuf, Erie county), and June 2, '08 (Lake Erie). This species is hermaphroditic, according to Sterki (NAUTILUS, 12, '98, p. 87).

Anodonta grandis Say. Autumn (Lea, III, '42); July, August (*ibid.*); October (Baker, '98). In Pennsylvania gravid females are frequent in August, September, October. I have found a single

gravid female on May 22, '08, out of a large number collected. Among numerous specimens collected on April 24, June 23, July 17 none were gravid. Thus the "interim" appears to extend over the month of May to July, with occasional individual exceptions.

Anodontoides ferussacianus Lea. Autumn (Lea, III, '42); October (*ibid.*). Found gravid in May, August and October. Among a dozen specimens, collected June 5, '08, in Little Shenango River, and among numerous specimens of the var. *subcylindraceus* Lea, collected on June 2, '08, in Lake Erie, not a single one was gravid. This would establish an interim at least in June. No dates are at hand for July.

Symphynota compressa Lea. Autumn (Lea, III, '42); March, September (Lea, *ibid.*). Gravid in May and beginning of June (June 2 in Lake Erie; only part of the outer gills charged). No gravid females taken during the rest of June, and during July, but only a small number of specimens was secured during this time. Beginning August 6, all through the month, and during September and October, gravid females were abundant. The color of the marsupium is very variable in this species: whitish, pink, orange, brown, and probably depends on the stage of development of eggs and embryos.

(*To be continued.*)

NOTES.

Shells new to the New England fauna.—In a very small portion of shell-sand gathered by Mr. John Robinson at Hampton Beach, New Hampshire, I discovered a genus new to America, namely *Homalogyra atomus* Phil. A subsequent visit to this place enabled me to add a number of forms new to the New England Coast north of Cape Cod. Among those thus far determined is a *Scissurella*, probably *crispata* Flem., and *Cœcum pulchellum* Stimp. A few years ago Miss Marjorie C. Newell discovered specimens of *Tagelus devisus* Spengl. on Coffin's Beach, and Miss M. W. Brooks has detected a specimen of this species at Hampton Beach.

Later I hope to make an extended paper with illustrations of these and other new additions to our molluscan fauna.—Edward S. Morse.

In his "Economic Zoology, an introductory text-book in Zoology with special reference to its applications in Agriculture, Commerce and Medicine," by Herbert Osborn, M. Sc., 1908, the chapter on Mollusca (p. 147–173) is partially illustrated by original figures. Figs. 94 and 95, labeled "Common Snail, *Patula alternata*" is apparently *Polygra profunda!* Except for a very brief allusion to the pearl and pearl-button industry, the only "economic" mollusks mentioned are the oyster and *Mya arenaria*, although to go no further away than our own coast, commercially the round clam or quahog is much the more important of our clams, and the scallop industry has assumed large proportions.

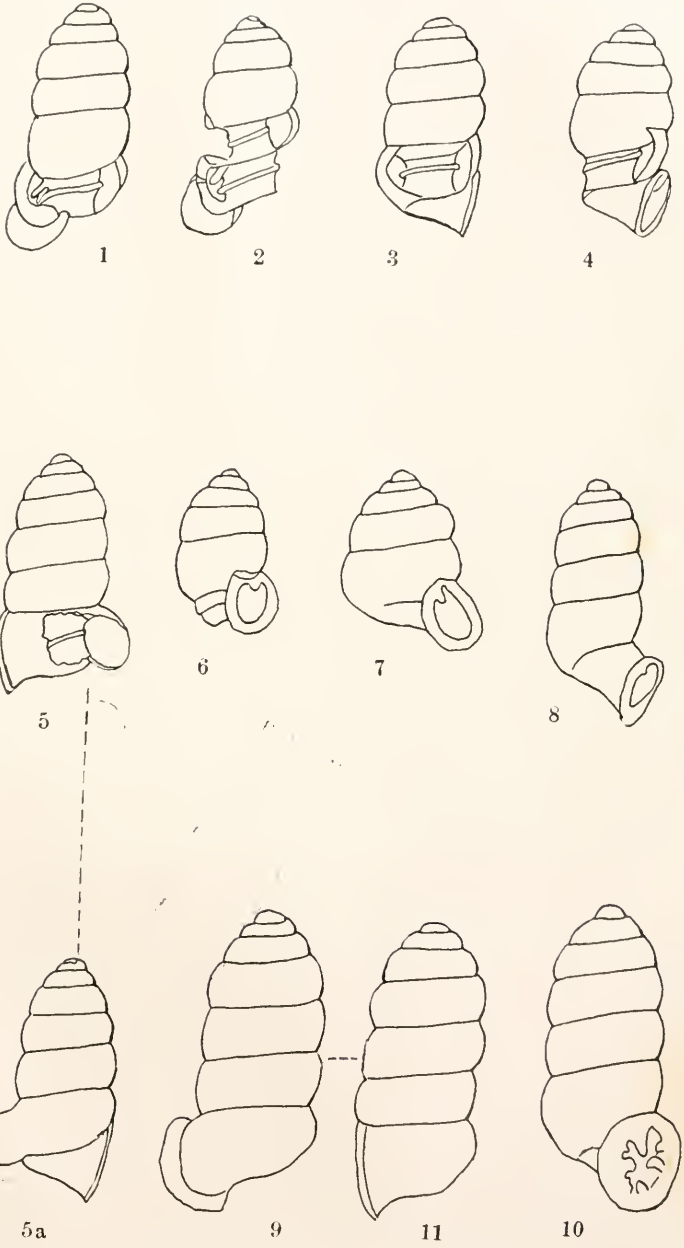
Alcadia pusilla intermedia, n. var. Shell intermediate in size between *A. pusilla* and *A. hollandi*, alt. 5.2, diam. 7.7 mm.; operculum roughened externally much as in *A. hollandi*, its columellar margin with sharp comb-like costulæ. Jamaica, (S. Raymond Roberts.) —H. A. Pilsbry.

Bifidaria tuba intuscostata Clapp. Plate VII, figs. 1, 2, 3, 4, Broken shells showing internal lamella × 10. 5, 6, 7, 8, Abnormal shells × 10. 9, 10, 11 Typical × 12.

PUBLICATIONS RECEIVED.

Description of New Cretaceous and Tertiary Fossils from the Santa Cruz Mountain, California. By Ralph Arnold. (Proc. U. S. Nat. Mus. xxxiv, p. 345, plates 31–37, 1908.) Descriptions of the various geological formations with lists of species, followed by descriptions of some thirty-seven new species.

Descriptions and Figures of some Land and Fresh-water Shells from Mexico, Believed to be New. By Wm. H. Dall, (Proc. U. S. Nat. Mus. xxxv, p. 177, plates 29–33, 1908.) A new species of Cœlocentrum (*C. palmeri* Dall and Bartsch) forms the type of a new section *Crossostephanus*. Three new *Streptostylas*, one *Euglandina* and one *Lampsilis* are described and figured. *Anodonta coarctata* Anton and *Diplodon websteri* Simpson are also figured. The latter from New Zealand, was described in The Nautilus, Vol. xvi, p. 30, 1902.



BIFIDARIA TUBA INTUSCOSTATA CLAPP

The Nautilus.

Vol. XXII. FEBRUARY, 1909. No. 10.

A WEEK AT CLAIBORNE, ALABAMA.

BY REV. H. E. WHEELER.

A part of my October vacation was spent with a party of geologists on a house-boat trip from Tuscaloosa, on the Warrior river, to Jackson, on the Tombigbee. The party consisted of the State Geologists from South Carolina, Georgia, Florida and Alabama, namely, Mr. Earle Sloan, Mr. T. W. McCaloie, Dr. E. H. Sellards, Dr. Eugene A. Smith and Dr. F. W. Prouty, besides Dr. George Little, of Tuscaloosa; Dr. Roland M. Harper, of New York, botanist; Hon. T. H. Aldrich, of Birmingham, paleontologist; and Dr. T. Wayland Vaughan, of the U. S. Geological Survey, who was studying in detail the correlation of the coastal plain geology of the Southern States.

One of the results of the expedition was the confirmation of our Alabama nomenclature for the cretaceous and tertiary formations so typically illustrated in this State. Another result was the fine series of fossils collected along the route.

From Jackson some of the party went to the sections about Mobile to study the Grand Gulf formation, while I made my way to the classic locality—Claiborne, on the Alabama river. To one who has but recently delved into the mysteries of paleontology no more encouraging formation could be desired than this. Made famous by the early work of Lea and Conrad, a fascination for every student since, it will not fail to yield treasures new and old to any zealous collector. A year ago I gathered a quantity of shells there, enough to fill the winter's evenings with rare pleasure, but this year I was even more fortunate.

The beautiful *Corbis lamellosa* Lam. was found in a thin layer of white sand in the ferruginous bed—quantities of them in perfect condition. Just as I was leaving I picked up a *Cypræa nuculoides* Ald.,[1] so far as I know never before reported from this locality. A fine large *Fusus* (*Clavilithes*) *protextus* Con. rewarded my laborious digging, as well as perfect specimens of most of the common species. It was on my last visit that I was fortunate enough to find the very rare *Cancellaria priama* Harris,[2] the type of which had unfortunately been broken. I obtained two enormous *Trochiformis infundibulum* Lea, and among other interesting, though not in every case rare, species may be mentioned the following: *Pisania claibornensis* Whitf., *Lutraria papyria* Con., *Avicula limula* Con., *Papillina papillata* Con. (very rare), *Fusus inauratus* Con., *Conus sauridens* Con., *Cornulina armigera* Con., a *Melongena* n. sp., *Limopsis cuneus* Con., *Fissurella tenebrosa* Con., *Sigaretus declivis* Con., *Actæon inflatior* Meyer, *Mathilda leana* Ald., *Leiorhynus prorutus* Gabb.

The locality ought also to be interesting to the collector of recent shells. I noted on the bluff the dainty *Glandina rosea* Fer.

Passing through the overgrown and deserted streets of the village,[3] one would hardly suspect that in former times it was important enough to be visited by General Lafayette (1825) in his tour of the States. But the old Masonic Hall in which he spoke still stands, though now removed to Perdue Hill, two miles away. Here (in Claiborne) Conrad taught the children of a wealthy family while he named the treasures of the ancient eocene sea. Two of Alabama's Governors—Bagby and Murphy—were residents of Claiborne when elected, and Charles Tait, to whom the scientific world is indebted for its first knowledge of this famous bed, was Alabama's first Federal Judge. On the "Bluff" itself stood old "Fort Claiborne," whose guns frowned vengeance on the crafty Choctaws; but gone now is the glory of the once proud river town, scattered are its families, and almost past recovery are its traditions.

But for how many years to come will these ancient seas continue to give up the secrets entrusted to them? Monuments that crumble and yet survive; frail shells on which the order of creation is too finely graven for human skill to imitate.

Blocton, Alabama.

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[1] NAUTILUS, Vol. XVI, p. 98, pl. 3.

[2] Bull. Am. Pal., Vol. I, p. 49, pl. 1, fig. 20.

[3] There are less than fifty inhabitants (white) in Claiborne to-day.

THE BREEDING SEASON OF UNIONIDÆ IN PENNSYLVANIA.

BY DR. A. E. ORTMANN.

(*Concluded from page 95.*)

Symphynota viridis Conr. August 24, '08, four gravid females were found among a dozen specimens; of 35 specimens collected by Dr. D. A. Atkinson on July 11, '08, not a single one was gravid.

Symphynota costata Raf. Autumn (Lea, III, '42); March, October (Lea, *ibid.*). I found gravid specimens in April, May (latest date, May 26), and then again in August (earliest date, August 9), September, October. Numerous specimens were collected in June and July, but none of them was gravid.

Symphynota complanata Barn. Autumn (Lea, III, '42); March (Lea, *ibid.*). Gravid females found on May 14, '08.

Alasmidonta undulata Say. September and October (Lea, II, '38). Gravid females on July 18 and August 12.

Alasmidonta heterodon Lea. August, September (Lea, II, '38); May (Lea, X, '63).

Alasmidonta marginata Say. October and December (Lea, II, '38). The western form was found gravid in August, September, October. Out of a number of specimens collected on June 5, 8 and 22 none was gravid. No dates at hand for July. The eastern form was found gravid on August 13. The western form (= *truncata* Wright = typical *marginata* Say) is hardly distinguishable from the eastern (=var. *varicosa* Lam.), see Pilsbry and Fox, NAUTILUS, '01, pp. 16 and 17).

GROUP B. SUMMER BREEDERS.

Some of the summer breeders (*Unio*, *Pleurobema*) have the outer gills only serving as marsupium, in others (*Quadrula*) all four gills are supposed to assume this function in the breeding season. Yet in many *Quadrulas* this condition is unknown, and, as we shall see below, the arrangement of the species into genera will need revision and correction. I enumerate the species here according to Simpson's Synopsis.

Unio gibbosus Barn. Summer breeder (Sterki, '95); July, August (Lea, III, '42). I found gravid females of this common species in June and July, and a single belated one on August 13. Hun-

dreds of individuals were collected in April, May, August, September, October, but no gravid females were among them.

Unio crassidens Lam. Summer breeder (Sterki, '95). I collected numerous specimens in July, August, September, October, but never found a gravid female. I never had a chance to get this species earlier in the season.

Unio complanatus Dillw. "But once annually, from April–May to July–August" (Conner, '07); May (Lea, X, '63). I collected this species only in the month of August, and consequently never found it gravid.

Pleurobema clava Lam. July–August (Lea, III, '42). Found gravid on June 18 and July 10. Specimens collected on May 14 and in August, September and October were not gravid.

Pleurobema aesopus Green. Summer breeder (Sterki, '95). Gravid on July 3 and 13, '08. Never found in the gravid state during August, September, October, when many were collected.

Sterki ('95) places this with the species, in which all four gills are charged, and (Pr. Ohio Ac., 4, '97, p. 391) with the genus *Quadrula*. Yet according to my observations only the outer gills serve as marsupium, and are distinguished at that time by a very peculiar red color; already Lea (X, '63, p. 432) enumerates this species among those which have red eggs, but he saw them only in the ovarium. Yet this "red" of the gills is entirely different from that of certain gravid species of *Quadrula*, being rather of a "lilac" hue.

Quadrula undulata Barn. Summer breeder (Sterki, '95). I collected many specimens in August, September, October, but did not find gravid females. The only one was found on July 3, '08; it had all four gills charged, which were whitish (not red).

Lea (X, '63, p. 417) says that only the outer branchiæ serve as marsupium, while Sterki ('95) puts it in group B, where all four branchiæ are said to be charged.

Curiously enough, Sterki ('95, p. 93) places the closely allied *U. multiplicatus* Lea (= *Q. heros* Say) with his group A (winter breeders), giving the date November 1, and says that also the marsupium is of the type A (*Lampsilis* type). Since the latter has been described and figured by Lea (VII, '60, p. 122, pl. 30, f. 105), and is distinctly of the *Quadrula* type, with all four gills charged, I believe that we have to deal with a *lapsus calami* for *U. multiradiatus* Lea.

Quadrula lachrymosa Lea. May (Lea, III, '42).

Quadrula pustulosa Lea. Summer breeder (Sterki, '95).

Quadrula rubiginosa Lea. July–August (Lea, III, '42); June (Baker, '98). I found this species gravid on May 27, June 30, July 3 and July 8. The marsupium corresponds to the account given of it by various writers; it is formed by all four gills, which are at that time deep red.

Quadrula subrotunda Lea. Summer breeder (Sterki, '95). Found gravid July 3 and July 13. During late summer and fall no gravid females were found, although many specimens were collected. All four gills are charged and of deep red color.

Quadrula kirtlandiana Lea. One gravid female was found on August 2, '07, among hundreds of specimens collected; all four gills were charged, and red. Later in the season, in August, September, October, no gravid females were seen.

Quadrula coccinea Conr. Found gravid on June 18, '08 (Neshannock Creek, McKean Co., collected by Mr. Dennis Dally on June 22, '08. There were, altogether, about a dozen of them, and in every case the marsupium did not agree with the type of the genus *Quadrula*, for only the outer gills were charged in their whole extent, and were whitish. This would remove this species from the genus *Quadrula*, and would place it with *Pleurobema*. (Baker, '98, p. 80, gives a description of the soft parts, and says "four gills used as marsupium," but this may not be founded upon personal observation, but may have been inferred from the systematic position of the species.)

Tritogonia tuberculata Barn. Gravid, according to Sterki (NAUTILUS, 21, '07, p. 48) on June 10, '07, and marsupium formed by all four gills. This would place the species with the genus *Quadrula*, where it would group with *Q. trapezoides* Lea. Since the specific name is preoccupied in this genus, and since none of the synonyms are available, a new name should be found, and I propose here: *Quadrula tritogonia* nov. nom. (I have discussed this point with Dr. Sterki, and he is of the same opinion.)

Of the other species of *Quadrula* found in Western Pennsylvania, *Q. hippopæa* Lea, *cylindrica* Say, *metanevra* Raf., *cooperiana* Lea, *obliqua* Lea, *pyramidata* Lea, *tuberculata* Raf., I have never seen gravid females, and nothing is known about their marsupium and breeding season.

The above observations on the breeding seasons of Pennsylvanian

Unionidæ fully bear out Sterki's division into two groups: summer and winter breeders. The breeding season of the summer breeders is short (maximum hardly four months), while in the winter breeders this season is prolonged, extending from late summer, through the winter into spring. Yet it must be borne in mind that probably in the single individual the breeding season does not fully occupy the whole length of the term, since it has been repeatedly observed that the embryos and ovisacs are discharged at various times, even in the beginning of the winter.

In some species belonging to the group of winter breeders the period of gravidity may be extremely long, so that the end of one breeding season (in May, June, July) may overlap with the beginning of the next (June, July, August), and such species may appear to breed "all the year round." This has been hinted at already by Sterki, and Conner gives the following instances: *Lampsilis radiata* and *Lampsilis nasuta*. My own observations make this condition probable in *Lampsilis ventricosa* and *Lampsilis luteola*. Yet in others an "interim" is very distinct in the early summer. This is the normal condition, according to Sterki, and has been found to be true for *Anodonta cataracta* by Conner, and by my observations it is made more or less probable for *Lampsilis ligamentina*, *Ptychobranchus phaseolus*, *Strophitus undulatus*, *Anodonta grandis*, *Anodontoides ferussacianus*, *Symphynota compressa*, *Symphynota viridis*, *Symphynota costata*, *Alasmidonta marginata*.

These peculiar conditions may be explained by the following assumption: *Quadrula*, with the four gills serving as marsupium, is, in my opinion, the most primitive type of our *Unionidæ*. Next to it stand *Pleurobema* and *Unio*, with only the outer gills serving as marsupium, but with the shell more or less resembling that of *Quadrula*. These forms represent also the most primitive type of the breeding season, which is short, and falls into the warm season. These forms existed already at a time when a uniform warm climate prevailed. At that time, possibly, the breeding season was not so restricted, but at the present time it has become so, since only during a short period of the year these old, primitive conditions prevail (in summer). Forms like *Unio* and *Quadrula* actually go back to mesozoic times.

All other genera are more advanced. The group *Alasmidonta*, *Symphynota*, *Anodontoides*, *Anodonta*, *Strophitus* (which is, according to Sterki, characterized by a peculiar glochidium) resembles in

the marsupium the *Pleurobema-Unio* type, but differs by a general tendency to reduce the hinge teeth. Another group is formed by the rest of the genera, in which the marsupium becomes very highly specialized, more or less restricted to a part of the outer gills, and where true ovisacs are developed. All these more advanced genera originated probably at a time when seasonal changes of climate existed already in our continent—in the tertiary—and the shortening of the warm period in summer possibly induced them to prolong the breeding season, that is to say, to postpone the discharge of the embryos to a more favorable time, namely, till the next spring. This made necessary special adaptations for the carrying of the embryos through the winter, and probably the ovisacs of the most highly developed genera belong to these special adaptations. In certain genera, ovisacs are not at all developed, and in *Strophitus* an independent form (placentæ). This lengthening of the breeding season finally led to the merging of the end of the one of them into the beginning of the next (known only in one of the most highly specialized genera, *Lampsilis*), while in less specialized genera, in *Alasmidonta*, *Symphynota*, *Anodonta*, also in *Ptychobranchus* and some species of *Lampsilis*, an "interim" in midsummer still exists.

I think this is a reasonable interpretation of the different types of breeding season and their development, yet it is proposed here as a mere theory, which should be substantiated by further investigations on the marsupium and the breeding seasons of our *Unionidæ*.

MOLLUSKS FROM AROUND ALBUQUERQUE, NEW MEXICO.

BY H. A. PILSBRY AND J. H. FERRISS.

A considerable amount of work has been done on New Mexican mollusks, and the numerous local lists published would make a good showing for the Territory if compiled into one catalogue. The more recent lists were based upon material collected by Professor T. D. A. Cockerell and his pupils, and by Messrs. Joshua L. and Albert Baily, Ferriss and Pilsbry. The records are to be found in NAUTILUS, ix, p. 116; x, p. 42; xi, p. 69; xii, pp. 76, 131; xiii, pp. 13, 36, 49, 79; xiv, pp. 9, 47, 72, 82, 85; xvi, pp. 57, 69, Mollusca of the Southwestern States, I, II, etc.

In 1906 we collected a few shells in the neighborhood of Albuquerque while waiting for trains.

The immediate environs of Albuquerque are barren of molluscan life. Only along the Rio Grande the drift débris affords small shells, the land forms probably washed down from the Sandia mountains, which rise north of the city. A low ridge of black volcanic rock frowning on the western horizon proved to be not worth the excursion. We found only a few *Pupoides marginatus* there. The nearer slopes of the Sandia mountains are also barren. A few small species were found in the canyon beyond the Agricultural College. A much richer fauna no doubt inhabits the higher slopes northward. Miss Maud Ellis found twelve species in Las Huartus canyon, at 8000–9000 feet elevation (NAUTILUS, xiv, 85).

The following forms were taken:

Helicodiscus eigenmanni arizonensis P. & F. Rio Grande drift; Sandia Mts.

Vitrea indentata umbilicata Ckll. Sandia Mts.

Zonitoides arborea (Say). Sandia Mts.; Rio Grande drift débris.

Zonitoides minuscula (Binn.). Sandia Mts.; Rio Grande drift débris.

Encomulus fulvus (Müll.). Sandia Mts.

Vallonia cyclophorella Anc.. Rio Grande drift débris.

Cochlicopa lubrica (Müll.). Sandia Mts.

Pupoides marginatus (Say). Rio Grande drift débris; volcanic ridge about 5 miles west of Albuquerque.

Pupoides hordaceus (Gabb). Rio Grande drift.

Pupilla blandi Morse. Rio Grande drift.

Bifidaria procera (Gld.). Rio Grande drift.

Bifidaria procera cristata P. & V. Rio Grande drift.

Bifidaria pellucida hordeacella (Pils.). Rio Grande drift.

Bifidaria armifera (Say). Rio Grande drift.

Vertigo ovata Say. Rio Grande drift.

Lymnæa bulimoides cockerelli P. & F. Rio Grande drift.

Planorbis trivolvis Say. Rio Grande drift.

Planorbis parvus Say. Rio Grande drift.

Valvata (*humeralis* Say?), one broken specimen. Rio Grande drift.

FOSSIL AND LIVING SHELLS FOUND IN LITTLE MUD LAKE, WESTMANLAND, AROOSTOOK COUNTY, MAINE.

BY OLOF O. NYLANDER.

This small lake is located in the forest near the south line of Westmanland Plantation, and is the headwater of Salmon Brook. This little lake contains some interesting shells not found in the county before. The deposit of dead shells (marl) is many feet in thickness, and is chiefly composed of *Pisidia*.

The living shells are extremely rare in the lake, and those collected came from small spring brooks at the north end of the lake. Dr. V. Sterki has kindly examined all the *Pisidia*. I do not know what the amateur collectors would do with these miserable little shells without his assistance. The fossils collected are as follows:

Lymnæa desidiosa Say. Common.

Planorbis campanulatus Say. Common.

Planorbis bicarinatus Say. A few young shells.

Planorbis hirsutus Gld. One specimen.

Planorbis parvus Say. Abundant.

Ancylus parallelus Hald. One specimen.

Valvata sp.? A variable species; some are nearly flat, others have the apex extremely elevated, a large percentage are decollate and the whorls are sometimes dislocated near the apex.

Mr. Bryant Walker has examined specimens and states: "They are extremely curious * * * I have never seen any like them before. They are no doubt a form of *V. sincera* Say."

Dr. W. H. Dall gives me the following information: "They are exactly like the depauperate form of *V. lewisii* Currier. * * * The distortions are familiar to me as found in marl deposits, the water becoming too much mineralized for the mollusks."

I made special efforts to obtain living specimens of this *Valvata* during the two trips to the lake, but not one could be found.

Anodonta fragilis Lam. Fragments.

Sphærium sulcatum Lam. A few valves.

Sphærium rhomboideum Say. Common.

Musculium sp.? probably *securis* Prime. Small.

Pisidium variabile Prime.

" *compressum* Prime.

" *affine* Sterki.

Pisidium mainense Sterki.
" *ventricosum* Prime.
" *costatum* Sterki.
" *medianum* var. *minutum* Sterki.
" *contortum* Prime.
" *triangulare* Sterki.
" *tenuissimum* Sterki.
" *splendidulum* Sterki.
" *splendidulum*, a new var.—Sterki.
" *abditum*? or closely related to that species.

The following living shells were collected:

Planorbis trivolvis Say. Two specimens.
Planorbis parvus Say. Three specimens.
Anodonta fragilis Lam. One specimen.
Musculium sp.? A small form, probably a new species.
Pisidium variabile Prime.
" *ventricosum* Prime.
" *subrotundum* Sterki.
" *mainense* Sterki.
" *medianum* var. *minutum* Sterki.
" *splendidulum* Sterki.
" *splendidulum*, a new variety.—Sterki.

As additions to the Aroostook county shells, I might mention *Pisidium punctum* var. *simplex* Sterki. Dead water Caribou stream, Woodland. Rare and new to the county.

Pisidium milium Hald. is common in Gelot's Lake, New Sweden. *Caribou, Me.*

REMARKS ON THE SUBFAMILIES HYRIINÆ AND UNIONINÆ.

BY L. S. FRIERSON.

A few facts having important bearing on the classification of the *Naiades*, having come to notice, are herewith given to the readers of NAUTILUS.

Two species of the genus *Pseudodon* were obtained from Sowerby and Fulton, showing beak sculpture. *P. vondembuschiana* Lea has a somewhat doubly looped sculpture. The anterior loops curve upwards; the posterior are straighter, sloping backwards and downwards.

P. walpolei has a sculpture much like that of the *Cristarias*, being heavy bars, more or less parallel with the growth-lines.

The important fact revealed by these specimens shows that the genus must be moved from the subfamily *Hyriinæ* and placed in the subfamily *Unioninæ*.

Two species of *Parreysia* (*P. corrugata*, and *P. wynegungaensis*) were received (numerous specimens) bearing eggs in all four gills, as in *Quadrula*. That these shells would be found bearing ova in all four gills was prophesied as being probable by Mr. Simpson (Synopsis, page 508).

The important bearing of this fact is that it proves that *beak sculpture and manner of carrying ova in the gills are not correlated.*

In this connection Mr. C. T. Simpson wrote (in a letter) several years ago that gravid animals of the group of *Unio* (*Nodularia*) *caffer* Krauss proved to carry eggs in their *outer gills*, and thus necessitated the moving of this group from the subfamily *Hyriinæ*, genus *Nodularia*, to the subfamily *Unioninæ*, genus *Unio*.

But in the light of further knowledge we see that our definition of the subfamily *Hyriinæ* (as differentiated from *Unioninæ*) must be amended. We must choose between beak sculpture ("radial *versus* concentric") or marsupial characters ("Exobranchiæ *versus* Endobranchiæ") in our definitions.

The judgment of the writer would be to drop the *marsupial* feature and adhere to the beak sculpture, thus giving for our definition of the subfamily *Unioninæ:* "Essentially concentric beak sculpture," and for *Hyriinæ:* "Essentially radial beak sculpture." Thus amended, the group of *Nodularia caffer* Krauss remains undisturbed, as originally located by Mr. Simpson.

DESCRIPTIONS OF TWO NEW AMERICAN PUPIDÆ.

BY V. STERKI.

VERTIGO NYLANDERI n. sp.

Shell perforated, oblong, with a rather acute apex, of deep horn color, pellucid; whorls $4\frac{1}{2}$–5, quite convex, with a deep suture, with sub-regular, crowded striæ (except the embryonal), the last occupying about one-half of the altitude, gradually narrowed towards the aperture, which is small; peristome slightly everted, margin not thickened; palatal wall with an indentation barely above its middle, forming a well-marked sinus and sinulus; behind it a trace of a crest, and behind that a long, deep furrow-like impression over the palatal

folds, ascending obliquely from near the base; no callus within; lamellæ and plicæ 6; parietal rather long and curved; parallel with it is a thin, lamelliform angular; columellar and inferior columellar rather small, short, the latter near the base; palatals long, the lower deep-seated, ending close to the beginning of the upper, one appearing to be a continuation of the other.

Alt. 1.6, diam. 0.9 mm.

Soft parts not seen.

Woodland, Aroostook county, Maine, collected in 1896 by Mr. Olof O. Nylander, in whose honor the species is named. I have two specimens on hand, the types (No. 1075 of my collection of North American *Pupidæ*); a few more are in the collection of Mr. Nylander. Ever since '96 the form was regarded as distinct, but not published. The two specimens are alike, mature and perfect, and cannot be deformed ones of some other species. In appearance and surface striæ they are somewhat like *V. gouldii* Binn., but otherwise the shell is quite different. In its shape, with the narrowed last whorl, it somewhat resembles *V. oscariana* St., but the lamellæ and plicæ are very different.

Bifidaria clappi n. sp.

Shell glossy, colorless to milky-whitish, perforate, cylindrical in the lower 3–4 whorls, conical or subconical above, with a rather acute apex; whorls $6\frac{1}{2}$–$7\frac{1}{2}$, the upper ones rather narrow, the lower ones broader and less convex, the last moderately large, ascending at the aperture, somewhat narrow but rounded at the base, slightly flattened over the palate; surface shining, with slight irregular to subregular striæ; aperture nearly oval, margins approximate; peristome everted, not thickened, but there is a slight to rather strong white callus in the palate; lamellæ and plicæ: parieto-angular distinctly complex, rather long, moderately elevated, connecting with the peristome near its outer upper terminus (much as in *B. armifera*), the spur[1] of the parietal moderately large; columellar axial spiral, with the lower end nearer the aperture, thicker and rather abrupt, or somewhat bifurcate; "basal" (inferior columellar) slight or wanting;

[1] In *B. armifera* and *clappi*, near the inner end of the parietal lam., there is a process, or "spur," outward, that is, towards the periphery, at nearly right angles, smaller or larger, generally visible in front view. So far it has been seen in no other species; but in *B. contracta* there is a protracted, curved part, lower than the rest of the lam., and not visible in front view.

upper and lower palatals regular, an interpalatal in many specimens; suprapalatal wanting or quite small.

Alt. 3.5–4 (rarely 3.2–3.4), diam. 1.9–2.1 mm.; aperture alt. 1.5, diam. 1.2 mm.

Soft parts, seen only from one dried Alabama specimen, soaked, very dark from copious, deep brown pigment. Jaw amber-colored, strongly curved, rather broad, rounded at the ends, its surface with numerous radial rib-striæ; the line of the attachment of the tenaculum strong.

Radula with 78 transverse rows of 27 (or 29) teeth, r + 6 + 7 (8); rachidian rather narrow, with a short mesodont and very small ectodonts (barely visible); laterals bicuspid, with the mesodont as long as the plate, the ectodont about one-third as long; the outer posterior angle of the plate raised, cusp-like; seventh and eighth with the ectodont split in two, somewhat intermediate or "transition" teeth; marginals (9–13) serrate, with the mesodont rather long, thin; the fourteenth a barely visible irregular transverse bar, or wanting. As this is from a single specimen, there may be some variation. Other parts could not be examined.

Habitat: Knoxville (various localities); eastern Tenn.; Fayetteville and Columbia, Tennessee; Gurley and Huntsville, Alabama; Grand Rapids, Michigan; "Ottawa, Illinois."?

The species shows little variation, except in altitude, with nearly the same diameter, and such as are noted in the description. There is no tendency towards having the peristome continuous. The types are from Knoxville, Tenn., but almost any good specimen seen from anywhere might be taken for a type.

B. clappi is remarkable for its resemblance to some forms of *B. armifera* Say, for a variety of which it has been taken. Yet it is quite distinct. Of over 150 specimens carefully compared with more than 1500 *armifera* not one was found doubtful or intermediate. The most tangible difference is in the shape of the columellar lamella. The shell averages somewhat smaller, the apex is more acute, the surface striæ are finer and slighter, the lower palatal plica is always

[1] *B. armifera* shows considerable variation with respect to size and shape, and in connection with it, in the shape of the columellar and lower palatal. These differences mark two main forms, varieties at least, the shell of one of them being more cylindrical and more or less resembling *clappi*, but the columellar (and lower palatal) are always different.

regular.[1] When one is once familiar with the species it is easily recognized. There is no doubt that specimens are in various collections as, and mixed with, *armifera*, and all such lots should be revised.

Specimens, as "*Pupa armifera*," were received in 1886–92 from the late Mrs. Geo. Andrews, collected at Knoxville, Tenn., at various places, marked: "Garden," "The Thicket," "under stones," aggregating 58 *armifera*, 51 *clappi*. In a lot of 32 from drift on the Duck river, Columbia, Tenn., sent by Prof. B. Shimek in 1892, 18 were *armifera* and 14 *clappi;* 5 specimens, of the latter only, from "Columbia, Tenn.," were received from Mr. A. A. Hinkley in 1887. Lately Mr. Geo. H. Clapp was kind enough to send me all his *armifera* for inspection; among them was a lot from "Eastern Tennessee," all *clappi;* one from Gurley, Ala., the same; and one from Huntsville, Ala., with 36 *armifera* and 1 *clappi*. The latter two were collected by Mr. Herbert H. Smith. Mr. Bryant Walker also kindly sent me his whole *armifera* material, 37 lots. Among them were *clappi* from Fayetteville, Tenn., and Huntsville, Ala., and, much to my surprise, from Grand Rapids, Mich. Also in a lot from "Ottawa, Ill.,"? which I owe to Mr. F. C. Baker, both species were represented. It seems then that the distribution of *B. clappi* is not only southeastern, as had been supposed, and it may be found in other parts of the country also.

I take pleasure in naming the species in honor of Mr. Geo. H. Clapp.

Strange Shells. One specimen: Umbilicate, cylindrical-turriculate; whorls $6\frac{2}{3}$, moderately convex, the last occupying nearly one-half of the altitude; aperture higher than wide, somewhat like that of *Cionella lubrica* except for the columellar part; peristome straight, thin and sharp; no trace of lamellæ and plicæ; colorless to pale horn; shell thin, translucent; surface with fine, irregular striæ; alt. 4, diam. 2 mm.; aperture alt. 1.5, diam. 1 mm.; umbilicus round, of about 0.5 mm. diam., and pervious into the preceding whorls. From Rose Hill, near Buffalo, N. Y., collected and sent by Miss E. L. Letson in a lot of *Bifid. armifera* Say, var. What is it? If it came from a foreign country, or even from some unexplored part of our own continent, one might be tempted to regard it is representing a n. sp., and even a new genus. But in all probability it is a freak, or monstrous specimen of *Bifid. armifera*. This had been written when I received, from Mr. Clapp, a somewhat corresponding

specimen, from Gastonburg, Ala. It was plainly a *B. armifera*, large, especially the last whorl, much larger than the penultimate, evidently overgrown, with a very small and slight parietal lam. A specimen, corresponding especially with the first-mentioned, of *Bifid. corticaria*, from Jackson county, Ala., was received years ago from Mr. H. E. Sargent. 3.1 mm. high; peristome straight and thin; aperture without a trace of lamellæ.

REV. A. B. KENDIG, D. D.

Dr. Amos B. Kendig, one of the best known Methodist clergymen of New England, died January 20, 1909, at Brookline, Mass.

Dr. Kendig was born in Lancaster county, Penna., in 1830, removing to Iowa when a young man. He at first studied law, but changed to the ministry, and was ordained in 1852. In the Civil War he served for a time as chaplain of the 9th Iowa regiment.

In 1875 Dr. Kendig came to Boston and became pastor of the Monument Square M. E. Church in Charlestown. Later he held pastorates in Lynn, Worcester and Boston; then going to Brooklyn, N. Y., East Orange, N. J., and New York City.

Dr. Kendig was known for his energy in all that he undertook. He was a man of devout Christian character, and he brought to his profession the courtesy and the manners of a gentleman of the old school. A man of broad culture and sympathy, he took great interest in scientific matters, and was a member of several learned societies. He took up the study of mineralogy at one time, aad made a large and fine collection of minerals, which he presented to a college in Iowa. Later he made a study of land shells of the world, built up a large and valuable collection, and accumulated a library. In 1903 he decided to give up the study of shells, his collection going to the Franklin and Marshall College, Lancaster, Pennsylvania. Dr. Kendig had many warm friends among conchologists. He is survived by two daughters, Mrs. George F. Kellogg and Mrs. Silas Peirce.

SUPPLEMENTARY NOTES ON THE BREEDING SEASONS OF THE UNIONIDÆ.

BY CHAS. H. CONNER.

Dr. A. E. Ortmann's article, relative to the breeding seasons of the *Unionidæ*, will doubtless be received as an interesting and valuable contribution to the subject, and in order to extend its usefulness, so far as my limited ability will permit, I beg to present a condensed report of my observations, made from 1905 to 1908 inclusive. I, too, have noticed some apparent variations in the breeding periods of individuals, as also in the species, in different years. Possibly this

difference may be due more or less to difference in the seasons (weather) from year to year.

The facts already obtained have an important bearing on legislative action already taken or contemplated for the protection and preservation of our fresh-water mussels. Unlike the song and game birds and the mammals, no close season will serve to protect all of the species. The taking of all clams under the fully adult size must be prohibited to prevent their extermination by pearl-hunters and button manufacturers.

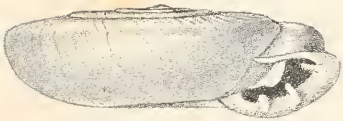
TABLE SHOWING GRAVID PERIODS OF THE UNIONIDÆ.

The letter *g* indicates gravid individuals, *n* denoting that none were found gravid, *gn* that some females examined were gravid, others not gravid, either among specimens taken at the same time or in the same month in different years.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Anodonta cataracta Say. . . .	g	g	g	gn	gn	n	n	n	g	g	g	g
Anodonta implicata Say. . . .	g		g	g	g	n	n	n	g	g	g	g
Anodonta undulata Say. . . .			g	n	n							g
Alasmidonta undulata Say. . .								g				
Alasmidonta varicosa Lamarck.					g	n						
Lampsilis cariosus Say		g	g	n	g	g	g		g	g		
Lampsilis ochraceus Say . . .				g	g	g						
Lampsilis radiatus Gmélin . .		g	g	g	g	g	g	g	g	g	g	g
Lampsilis ventricosus Barnes. .									g			
Lampsilis ligamentinus Lamarck.								g	g			
Margaritana margaritifera L. .	n					g		g			n	
Quadrula multiplicata.											g	
Quadrula perplicata Conrad. .											n	
Quadrula trapezoides Lea . . .											n	
Strophitus edentulus Say. . . .								g				
Symphynota viridis Conrad . .								g				
Unio complanatus Solander . .	n		n	gn	g	g	g	gn	n	n	n	n
Unio heterodon Lea.		g										
Unio nasutus Say	g	g	g	g	g	g	gn	g	g	g	g	g
Unio northamptonensis Lea.	approximately as *U. complanatus*.											
Unio occidens Lea									g			
Unio rectus Lamarck.								g				
Anodonta footiana Lea								g				
Anodonta subcylindraceus Lea .								g				
Lampsilis superiorensis Marsh .								g				

1

2



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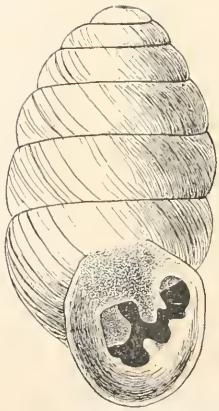

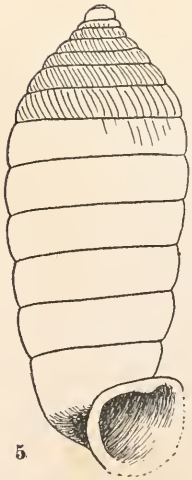

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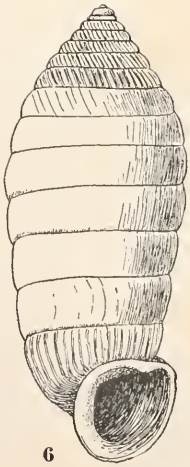

6

7

1, 2, 3, ASHMUNELLA KOCHII CLAPP. 4, BIFIDARIA CLAPPI STERKI.
5, 6, HOLOSPIRA BARTSCHI P. & C. 7, BIFIDARIA BILAMELLATA STERKI & CLAPP.

The Nautilus.

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PISIDIUM IN MASSACHUSETTS.

BY REV. HENRY W. WINKLEY.

During the past two summers the writer has had opportunity to collect in various places in Massachusetts, and *Pisidium* has yielded some good series. The species have just been determined by Dr. Sterki, with the following results:

Dalton, in the Berkshire Hills—a brief visit in early spring—yielded *compressum* and *abditum*.

Newton, Upper Falls, gave at one visit *variabile*, *aequilaterale*, *pauperculum*, *affine* and *ferrugineum*.

Woburn, in a small outlet to Horn Pond, had *compressum*, *abditum* and *affine*.

Concord, near the famous battlefield, shows *variabile*, *abditum*, *compressum*.

Wareham is at the head of Buzzards Bay, almost on Cape Cod. It is an important place in cranberry culture. Considerable material was obtained from ditches in the cranberry bogs. The species *variabile* and *abditum* both show local peculiarities; *ferrugineum* also occurs in the bogs. A trout brook in the woods gave excellent sets of *variabile*, with *abditum* quite rare.

The Agawam River at East Wareham is one of the richest collecting grounds I know. *Pisidium* is not abundant, but is peculiar. Dr. Sterki writes of *variabile:* "Rather different from the common form, and representing a variety if found at other places," another form similar yet distinct.

Danvers, my present home, proves an excellent region for this

genus. A few tiny brooks are teeming with fresh-water shells, and the town has the following species: *compressum*, *variabile*, *abditum*, *ventricosum*, *ferrugineum succineum*, *neglectum*, *aequilaterale*, *ferrugineum* and *splendidulum*, "for the first time seen in large numbers from Massachusetts." A few forms not quite settled may show more of interest. A more careful search next summer may yield even more species from this interesting locality.

NOTES ON SHELLS COLLECTED AT BALSAS, GUERRERO, MEXICO, BY MR. WALTER E. KOCH, IN DEC., 1908.

BY H. A. PILSBRY AND GEO. H. CLAPP.

These shells were found in the crevices of the limestone rocks bordering the Rio Balsas, and the ravines leading to it, and about 1000 feet above the river, or at an altitude of 2000–3000 feet. No living shells were seen, and limited time prevented a very thorough search.

EUGLANDINA LIEBMANNI (Pfr.).

The specimens have the more minute sculpture very beautifully developed, agreeing with Strebel's account of the type specimen. There is also a coarser form in some other localities, which seems to be more abundant in collections.

POLYGYRA MATERMONTANA Pils.

A series of eleven specimens shows great variation in size and shape of the umbilicus, and better preserved examples might possibly show the presence of more than one species in the lot. The extremes in size are 7.3 mm. diam. with 5 whorls, and 11 mm. with $5\frac{1}{2}$ whorls.

OXYSTYLA ZONIFERA (Strebel).

Typical examples of this well-marked species.

HOLOSPIRA BARTSCHI n. sp. Pl. viii, figs. 5, 6.

The shell is white, imperforate, oblong, widest at the eighth or ninth whorl, rapidly tapering to the last whorl; terminal cone short, the apex mamillar. Two embryonic whorls smooth, gray, projecting, the first whorl wider than the second; following three whorls

sculptured with slender riblets parted by wider intervals; the riblets then become irregular and weaker; at and below the shoulder they disappear, and the whorls are nearly smooth and flat to the last, which is ribbed, the ribs rather strong but irregular on the last half whorl, which is straightened, tapers to the well-rounded base, and is very shortly produced forward beyond the preceding whorl. The aperture is very shortly piriform, upper margin straightened with a slight callus within near the outer angle; other margins well curved and expanded. Internal axis rather wide throughout, widest above, smooth, its walls slightly concave within each whorl. At the end of the penultimate whorl there is a barely noticeable swelling of the axis, hardly visible in some specimens, and with no superposed callus.

Length 14.8, greatest diam. 5.8 mm.; whorls 14.

Length 15, greatest diam. 5.9 mm.; whorls 14.

Length 18.25, greatest diam. 5.3 mm.; whorls 13¾.

The length is estimated, since all of the examples have the peristome more or less broken basally. While very "top-heavy," it is less obese than *H. imbricata* v. Marts., which is strongly ribbed throughout. No other species of similar shape has the same axial structure. In having a large internal pillar, *H. bartschi* resembles *H. fusca* v. Marts. Neither species is a typical *Haplocion*, but they agree with no other of the defined sections of *Holospira*.

This species is named for Mr. Paul Bartsch, author of an excellent paper on *Holospira* and related genera.

HOLOSPIRA GOLDMANI Bartsch.

One example, 13 x 5 mm., agrees well with a cotype of this species, received from the National Museum through the courtesy of Dr. Dall. *H. gealei* H. Ad., of which the internal structure is unknown, may prove to be allied. It is not unlike *goldmani* externally, so far as can be gathered from Adams' inadequate description.

A NEW SPECIES OF PHOLADOMYA.

BY WM. H. DALL.

The figured type of the genus *Pholadomya* Sowerby is the recent *P. candida* Sow., from the island of Tortola in the West Indies, described in 1823. A large number of fossil species are known, but

during the eighty-four years which have elapsed since Sowerby characterized the genus, only one more recent species which can confidently be affirmed to belong to the typical section of the genus has been described. This is the *P. loreni* Jeffreys, 1881. *P. candida* has its hinge composed of a pair of nymphs sustaining the external ligament, and in front of the nymphs a triangular area, directly under the beaks, which supported an internal resilium, some fibers of which still adhere to the specimen in the National Museum. The anterior edge of the resiliifer is raised into a rib-like prominence, which is what in descriptions of the genus is usually referred to as an "obscure tooth." It is not a tooth, but a reinforcement of the pit or chondrophore. Not having a specimen for study in 1895, my description of this hinge from figures (Trans. Wagner Inst., iii, p. 530) is to this extent inaccurate. It is true that Verrill in 1881, and Locard in 1898, have described two bivalves under the names of *Pholadomya arata* and *P. africana* (Fischer MS.), but these do not belong to the typical section of the group and may belong in a wholly distinct genus. They are wedge-shaped, truncate shells with the chondrophore obsolete, and having an aspect which leads one to doubt whether the resilium was developed at all in either of them. Their soft parts are wholly unknown. It is therefore a matter of especial interest that in recent work of the U. S. S. *Albatross* in the N. W. Pacific, Aug. 10, 1906, at station 4904, in 107 fathoms, a right valve of *Pholadomya* was obtained, which I now propose to describe.

PHOLADOMYA PACIFICA n. sp.

Shell resembling an unusually plump specimen of *Mya arenaria* in general form, white, very thin, the beaks near the anterior third; inner layer of the shell pearly; beaks low, slightly prosocoelous; anterior margin of the valve evenly rounded, posterior a little attenuated and with a slight gape but also rounded; hinge-line thin with a short, narrow nymph, the chondrophore also narrow, directed obliquely backward, under and nearly parallel with the nymph; interior polished when fresh, the specimen rather dull, almost concealing the pallial sinus, which is less deep than in *P. candida*. The muscular impressions are obscure, but seem to agree with those of hat species; exterior largely, finely granulose, like many *Thracias*, sculptured with more or less evident lines of growth, and with abo

nine low radial ridges, starting from the beak, near which there are some intercalary ridges which become obsolete about the middle of the disk; both ends of the shell are destitute of radial sculpture for about one-fourth the total length; there is no defined dorsal area, lunule or escutcheon. Length of valve 48; length behind the beak 30; height 34; height of beak above the hinge-line 2.5; (double) diameter 26 mm. The sparse radial sculpture in the middle of the shell is almost exactly like that of *P. candida*, except that in the latter there are obscure nodosities on the ridges and no intercalaries, while both ends have obsolete radial lines. In one specimen of *P. candida* there are eleven ridges. The sculpture of *P. arata* and *africana* is quite different. The base of *P. pacifica* is gently arcuate. The specimen is registered in the U. S. Nat. Mus. as No. 110,456. It may be added that the granulation of the surface in *P. candida* is much less dense and conspicuous.

THE SHOWALTER COLLECTION.

BY HERBERT H. SMITH.

Every student of North American fresh-water shells is familiar with the name of Dr. E. R. Showalter. He collected, probably, three-fourths of the Alabama *Pleuroceratidæ* described by Lea, and not a few of the *Unionidæ;* many of Anthony's species came from him, and he corresponded for years with Lewis, Hartman and other eminent conchologists. Dr. Showalter resided at Uniontown, Perry county, and afterwards at Point Clear, near Mobile, and he made extended excursions to the Cahaba, Coosa and other rivers of the Alabama system. His work, interrupted by the Civil War, was taken up again about 1867, though not apparently with the same enthusiasm. Until Aldrich took up the task, Showalter was almost the only man in this rich field, and his specimens are scattered through all our collections.

Few naturalists know that Dr. Showalter had a collection of his own, and fewer still imagine that it is in existence. It had, in fact, a narrow escape from destruction. After Dr. Showalter's death the shells were stored for years under his house at Point Clear. Like

most southern houses, this is supported by corner pillars, the space beneath being open to the winds and often to driving rains. Some of the boxes rotted, specimens fell out and labels decayed; when at length the collection became the property of the Alabama Geological Survey, portions of it had literally to be scooped up with a shovel. The condition was not encouraging, but such things always look worse than they really are. No doubt some specimens and labels were irretrievably lost, but by far the greater part of the collection was saved intact, and for this we must thank the able director of the Geological Survey, Dr. Eugene A. Smith. From the first he was keenly alive to the value of the Showalter shells, but with the means at his disposal he could do no more than preserve them from further harm; this he has done conscientiously. For years the collection has been stored in the State Museum at Tuscaloosa, but it could not be made available to students.

Some months ago Mr. Bryant Walker asked me to examine the Showalter collection and, if possible, catalogue the *Unionidæ*. Dr. Smith placed the shells unreservedly in my hands and forwarded the work by every possibly means; ultimately he asked me to arrange the whole collection, and this I am now doing.

Later on I hope to give a more extended account of this historical collection. It is much richer than I had imagined, and nearly all can be saved to science. For the student of Alabama *Pleuroceratidæ* its importance can hardly be overestimated; species which have been among the rarest in our collections are here represented by hundreds, sometimes thousands, of good specimens, and these, if not exactly cotypes, are at least the lots from which types were taken. Generally speaking, the shells are correctly labeled, far better than *Pleuroceratidæ* in the majority of our cabinets. The *Unionidæ* and land shells are also important. Dr. Showalter had a general collection of no great extent, and this will be useful for educational purposes.

Every naturalist will be glad to know that the Showalter collection can be saved, and that it will soon be housed in the new museum building. The liberal character of Dr. Smith is a sufficient guarantee that the specimens will be available to every true student.

State University, Tuscaloosa, Ala., Feb. 9, 1909.

RECORDS OF MINNESOTA MOLLUSKS.

BY L. E. DANIELS.

The month of July, 1905, I spent at various points in Minnesota, and incidentally did some collecting of mollusca; and since there has been so little published on the mollusca of Minnesota, I contribute my mite.

The following is a complete list of my catch. At Thief River Falls and White Earth Lake I collected several days; at the other localities but a few hours, so that this list cannot be taken as a complete fauna of either locality. At the time of my collecting, the rivers and lakes were very high, which will account for the scarcity of fluviatile species.

In order to shorten the names of the localities I will say that Halma is in Marshall county; Anita and Thief River Falls in Red Lake county; White Earth Lake in Becker county; Lake Harriett, near Minneapolis, in Hennepin county; and Cannon Lake in Rice county.

Polygyra multilineata (Say). Minneapolis.

Circinaria concava (Binn.). Minneapolis.

Vitrona limpida Gld. Thief River Falls.

Vitrea hammonis (Strom.). Thief River Falls, White Earth Lake.

Vitrea binneyana (Morse). Thief River Falls, White Earth Lake.

Euconulus fulvus (Müller). Thief River Falls, White Earth Lake.

Euconulus chersinus polygyratus Pils. Thief River Falls, White Earth Lake, Anita.

Zonitoides arborea (Say). Thief River Falls, White Earth Lake.

Zonitoides minuscula (Binney). Thief River Falls.

Zonitoides milium (Morse). Thief River Falls, White Earth Lake.

Pyramidula alternata (Say). White Earth Lake, Minneapolis.

Pyramidula cronkhitei anthonyi Pilsbry. White Earth Lake, Cannon Lake, Anita.

Helicodiscus parallelus (Say). Thief River Falls, White Earth Lake, Anita.

Punctum pygmæum (Drap.). Thief River Falls.

Succinea retusa Lea. White Earth Lake, *var.* Thief River Falls.

Succinea ovalis Say. Thief River Falls, *var.* Minneapolis.

Succinea avara Say. Thief River Falls, Cannon Lake.

Succinea avara vermeta Say. White Earth Lake.

Strobilops virgo (Pils.). Thief River Falls. White Earth Lake.

Bifidaria contracta (Say). Thief River Falls, White Earth Lake.

Bifidaria pentodon (Say). Thief River Falls.

Bifidaria tappaniana (C. B. Adams). White Earth Lake.

Bifidaria holzingeri Sterki. White Earth Lake.

Cochlicopa lubrica (Müller). Thief River Falls. Also a form which seems to be *C. l. morseana* Doherty.

Vallonia costata (Müller). Thief River Falls, White Earth Lake.

Carychium exile canadense Clapp. Thief River Falls, White Earth Lake.

Lampsilis luteola Lam. Thief River Falls.

Anodonta kennicotti Lea. Thief River Falls.

Unio gibbosus Barnes. Thief River Falls.

Quadrula lachrymosa Lea. Thief River Falls.

Sphærium simile Say. Lake Harriett.

Sphærium occidentale Prime. Thief River Falls.

Musculium jayanum Prime. Thief River Falls.

Pisidium sp. Thief River Falls.

Campeloma subsolidum Anthony. Mississippi River, Minneapolis.

Campeloma rufum Hald. Lake Harriett.

Campeloma milesii Lea. Thief River Falls.

Valvata sincera danielsi Walker. Cannon Lake.

Valvata tricarinata Say. Cannon Lake.

Valvata tricarinata simplex Gld. Cannon Lake.

Amnicola limosa Say. *Var.* Cannon Lake.

Physa ancillaria Say. Lake Harriett.

Physa gyrina Say. Lake Harriett.

Physa gyrina hildrethiana Lea. Thief River Falls.

Physa gyrina oleacea Tryon. White Earth Lake.

Aplexa hypnorum (Linn.). Thief River Falls, Halma.

Lymnæa stagnalis appressa Say. Thief River Falls, White Earth Lake, Halma, Lake Harriett.

Lymnæa stagnalis var. Lake Harriett.

Lymnæa obrussa Say. Thief River Falls, Cannon Lake.

Lymnæa obrussa modicella Say. Thief River Falls.

Lymnæa sterkii Baker. Thief River Falls.

Lymnæa coperata Say. Thief River Falls, Anita.

Lymnæa palustris Müller. Thief River Falls, Cannon Lake, Halma, Anita.

Planorbis bicarinatus Say. Lake Harriett, Cannon Lake.

Planorbis trivolvis Say. Thief River Falls, Cannon Lake, Halma, Lake Harriett.

Planorbis campanulatus Say. Thief River Falls, White Earth Lake, Cannon Lake, Lake Harriett.

Planorbis hirsutus Gld. Cannon Lake.

Planorbis parvus Say. Thief River Falls, Anita.

Segmentina armigera Say. Thief River Falls.

TWO NEW VARIETIES OF CYPRÆA FROM N. E. QUEENSLAND.

BY H. B. PRESTON.

Among a number of *Cypræa* from N. E. Queensland recently received there occur two varieties, one of *C. xanthodon* Gray and one of *C. miliaris* Gmel., which, though undoubtedly belonging to these species, possess such marked varietal characters as to merit notice. I therefore venture to describe them, as follows:

Cypræa xanthodon Gray, var. *carnicolor*, n. var.

Dorsal surface flesh-colored without bands, indistinctly freckled with pale rusty-red; base white; posterior and median columellar denticles red, anterior columellar denticles white; denticles on lip pure white throughout; thinner and more piriform than the type; the posterior extremity of the outer lip is more produced, while that of the columellar lip is less so than in the typical form; moreover, there is no dark blotch on the columellar anterior extremity of the dorsal surface.

Alt. 24, diam. maj. 14 mm.

Hab.: N. E. Queensland.

The above has all the appearance of a deep-water shell.

Cypræa miliaris Gmel., var. *nivea*, n. var.

Differing from the typical form in having the dorsal surface grayish-white, gradually shading to pure white towards the base,

spotted indistinctly with numerous small white spots; there is scarcely any sign of lateral punctation on the columellar side.

Alt. 35, diam. maj. 22 mm.

Hab.: N. E. Queensland.

NOTES.

Pearl-hunting in the Fox River, Illinois.—Pearl-hunting commenced in the Fox river this last summer. One or two pearls were found by accident before. Now several tons of the shells have been taken out, perhaps as much as ten tons. Many of the nearby residents have done some hunting for sport, but two parties made a business of pearl-fishing, and perhaps worked 90 days. They received $1,800 for the pearls taken out. Two pearls were valued at $600 each. Jewelers from New York city wrote to a firm in Aurora, Ill., telling them to buy all the Fox river pearls they could get, as they were of the finest quality. Thus the craze spread late in the fall until, I am told, one could count fifty persons in sight hunting clams. They worked until the law to protect clams during breeding season went into effect.—L. A. Keene, Waterman, Ill.

Planorbis bicarinatus.—In order to complete the records of distribution of *Planorbis bicarinatus*, records, preferably accompanied by specimens, are desired from Newfoundland, Nova Scotia, Florida, Louisiana, Mississippi, South Carolina, South Dakota, Wyoming, Utah, Nevada, Arizona and California. The data obtained will be published in The Nautilus.—Bryant Walker, 205 Moffatt Building, Detroit, Mich.

Dr. W. Hoyle, Director of the Manchester Museum, has been appointed Director of the National Museum of Wales at Cardiff.

PUBLICATIONS RECEIVED.

Pyramidellidæ of New England and Adjacent Region. By Paul Bartsch (Proc. Boston Soc. Nat. Hist., Vol. 34, pp. 67–113, pl. 11–14, 1909). An interesting and valuable paper giving in detail the work done by various authors, followed by descriptions of all the genera, subgenera and species. Under Pyramidella are placed two subgenera—Eulimella and Syrnola. One new species,

P. (*Syrnola?*) *winkleyi*, is described from Branford, Conn. Turbonilla is divided into five subgenera—Ptycheulimella, Chemnitzia, Turbonilla, Strioturbonilla and Pyrgiscus. A new subspecies, *T.* (*Strioturbonilla*) *bushiana abyssicola*, is described from 1290–1537 fathoms off Martha's Vineyard. *T. verrilli*, *vineæ*, *branfordensis*, *buteonis*, *winkleyi*, *senilis*, *sumneri*, *cascoensis*, *whiteavesi* and *edwardensis* of the subgenus Pyrgiscus are described as new; the last two are from Prince Edward Island. *T. mighelsi* is proposed for *T. costulata* Verr. 1873 (*non* Risso 1826). Under Odostomia six subgenera are recognized—Chrysallida, Evalina, Iolaea, Menestho, Odostomia and Liostomia. The following are new: *O.* (*Chrysallida*) *bushiana* and *willisi*, *O.* (*Evalina*) *winkleyi*, *O.* (*Iolaea*) *hendersoni*, *O.* (*Menestho*) *trifida bedequensis* and *bisuturalis ovilensis*. *O. morseana* is proposed in place of *O. sulcata* Verr. 1880 (*non* A. Adams 1860). The *Pyramis striatula* Couthouy forms the type of a new genus, *Couthouyella*. There are excellent figures of nearly all the species.

C. W. J.

Natural History, Organization and Late Development of the Teredinidæ or Ship-worms. By Charles P. Sigerfoos. (Bulletin of the Bureau of Fisheries, xxvii, pp. 193–231, pl. vii–xxi.) *Xylotrya gouldi*, *Teredo dilatata* and *T. navalis* from Beaufort, N. C., have been investigated. *T. navalis* carries the eggs in the gills, but in the other species they are laid free into and fertilized in the water. In one case *T. dilatata* was estimated to produce one hundred million eggs. The egg develops into a typical small bivalve having a swimming organ (velum). Throughout the summer these may be found crawling over wooden structures in search of favorable crevices for attachment. Once attached by a single long byssus thread, the larva loses the velum, scrapes away the surface of the wood with the ventral edges of the shell-valves, and the foot develops into a pestle-shaped organ which assists the shell in burrowing. On the external surface of the valves at the anterior edges is formed the first row of small teeth, which at this and later stages are the mechanical agents by which the animal bores into the wood. This transformation has taken place within two days from the time the larva has settled, and afterwards the animal rapidly becomes an elongate ship-worm. Evidence is given showing that the ship-worm may reach a length of 4 feet and diameter of 1 inch in about one year. The sexes are separate in adult ship-worms, but young individuals of *X. gouldi* are frequently hermaphroditic, in which case the male cells develop first. The anatomy is very fully described and illustrated. This timely paper, a valuable addition to our knowledge of Pelecypod morphology, can be obtained of the Bureau of Fisheries.

H. A. P.

DAVID W. FERGUSON.

The Brooklyn Conchological Club mourns the loss of its esteemed member, Mr. David W. Ferguson, whose death occurred on February 7th, in his 75th year.

Mr. Ferguson began collecting shells in his eighth year, continued up to the time of his death, and became one of the most discriminating collectors in New York city. His knowledge of shells and ability to recall names was remarkable. In his early life he enjoyed the friendship of Bland and the elder Sowerby, and also of Dr. Jay, Stuart, Steward, Constable and all the collectors in New York of the last half of the 19th century. One of his most intimate friends in later years was the late Sloman Rous, who described several unusual species in his collection in THE NAUTILUS some time ago. Mr. G. B. Sowerby named a large white cone, *Conus fergusonii*, which Mr. Ferguson had sent him for identification. It is a fine and distinct species.

Mr. Ferguson was also a collector of Indian relics, and at the time of his death possessed a very large collection, all local to Long Island and nearby New Jersey. The region where these were obtained is now entirely built over, rendering the collection quite valuable at the present time.

DR. LORENZO G. YATES.

We regret to announce the death of Lorenzo Gordin Yates, of Santa Barbara, California. Born in England, January 8, 1837, he came to the United States in 1853. He taught in the public schools of Wisconsin, and studied medicine and dentistry. Later, Dr. Yates was on the staff of the Whitney Geological Survey of California. He was especially interested in conchology, mineralogy and botany, and published numerous papers on various zoological and botanical subjects. His principal papers relating to conchology are: "The Mollusca of Santa Barbara County, California," and "New Shells from the Santa Barbara Channel" (Bull. No. 2, Santa Barbara Soc. Nat. Hist., 1890). A new variety of *Helix carpenteri* from southern California (NAUTILUS, vol. iv, pp. 51, 54, 1890), and other notes. He was a fellow of the Linnæan Society of London, member of the Southern California Academy of Sciences, of the Geological Society of America, etc.

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SOME NOTES ON CYPRÆA OF THE PACIFIC COAST.

BY WILLIAM HEALEY DALL.

In 1906–07 Senor Don Joaquin Gonzales Hidalgo published in the Memorias of the Real Academia de Ciencias, Madrid, a useful review of a monographic character, without figures, on the genus *Cypræa*, in which the author includes *Trivia*.

In looking over the species of the west coast of America, and referring to the above-mentioned paper, some questions were raised in my mind, leading to the following notes being recorded.

CYPRÆA EXANTHEMA L. and var. *cervinetta* Kiener. Both the typical form and the variety are found on both sides of the Isthmus of Panama, and no constant differences seem to exist between Atlantic and Pacific specimens, when a sufficiently large series is compared.

CYPRÆA ROBERTSI Hidalgo, 1906. This name is proposed for the well-known *C. punctulata* Gray, 1824; not of Gmelin 1791.

CYPRÆA ANNETTÆ Dall, n. nom. The name *C. sowerbyi* applied by Kiener in 1845, to a well-known West American species, is pre-occupied by Anton (1839) and Gray (1832). Kiener figured a worn specimen under the name of *C. ferruginosa*, a name which had also been used by Gmelin, 1791, for another species. Sowerby in the Conchological Illustrations (1837) referred the *C. sowerbyi* Kiener, to the *C. zonata* Lamarck, 1810; but the latter, though allied, is distinct and comes from the African coast. I may note that the *C. zonata* of Lamarck and Sowerby (after Chemnitz) had

already been named *C. zonaria* by Gmelin (1791). Our shell being nameless, I propose to call it *C. annettae.*

Cypræa caput-draconis Melvill, lives on the reefs at Easter Island and the locality "Hong Kong" is probably erroneous.

Cypræa mexicana Stearns, is omitted by Hidalgo.

Trivia californiana Gray, (1828) was inaccurately monographed by Reeve under the name of *T. californica;* which, having been inadvertently adopted in Carpenter's British Association reports, has been more or less commonly in use ever since.

Trivia costispunctata Gaskoin, 1870, reported from California, if correctly located, is probably only a mutation of *T. radians* Lamarck.

Trivia solandri Gray, and Cypræa spadicea Swainson, are reported from Vancouver Island by Hidalgo, but his authority was doubtless inaccurate, as neither species is known north of latitude 34° 30′ N., and even *T. californiana* is not yet reported north of Bodega Bay in latitude 38° 15′.

It is much to be desired that Californian naturalists will determine from the living animals whether the important differences stated to exist between *Trivia* and *Cypræa* are really as stated; since, if confirmed, the two genera can hardly be retained in the same family.

Erato is not included in Hidalgo's lists, though so closely related to *Trivia;* but I may add that since describing *E. albescens* in 1905 (Nautilus, xviii, p. 124) the details of the station have come to hand and it seems that the type specimen was dredged in 30–41 fathoms, sand, off the western Santa Barbara Islands, California.

BIFIDARIA BILAMELLATA STERKI AND CLAPP, N. SP.

BY V. STERKI.

Shell small, slender, cylindrical or slightly attenuated above, with an obtusish apex, perforate; whorls 5½, subequal, the apical ones comparatively large; colorless to pale or reddish-horn,[1] transparent; surface shining, with very fine, crowded, subregular striæ, on the apex microscopically rugulose; the last whorl ascending above, somewhat flattened at the base close to the aperture, keel-like further

[1] So far as can be seen from drift specimens.

back, somewhat flattened over the palate, with a slight to strong, not sharp, crest behind the margin, with two spiral impressions, one over the lower palatal and another near the base; aperture broadly elliptical to almost circular, peristome continuous or its ends closely approximate and connected by a raised callus, well everted, with a slight to rather strong lip thickening; lamellæ and plicæ, parietal and angular, well differentiated, connected, large, the angular connecting with the peristome; columellar complex, with a lower axial and an upper horizontal part, "basal" a short, transverse lamella, rather abrupt; lower palatal far remote from the margin, but visible in front view, rather long, lamellar, thin, upper palatal somewhat less deep-seated, close to the lower, somewhat oblique, shorter.

Alt. 2–2.4, average 2.2, diam. 0.9 mm.; aperture alt. 0.8 mm. Soft parts not seen.

Habitat: Foothills of Plumosa Range, about 8 miles east of Quartzsite, Yuma county, Arizona, in drift, in company with *B. hordeacella* Pils. and *B. tuba intuscostata* Clapp, discovered by Mr. Geo. H. Clapp, who states that the ratio of *bilamellata* and *hordeacella*, in the drift, was almost exactly 1:16. Large numbers of both species were found.

B. bilamellata is very distinct and different from all other *Bifidaria*. At first sight it might be taken for *hordeacella* for its size and shape, but a glance at the aperture is sufficient to recognize it, and also the posterior aspect is different. With respect to the peristome it approaches *B. ashmuni*; the parieto-angular lamella is of the same formation, and the palatal plicæ are similar but not so deep-seated; the "basal" is the same as in *B. dalliana*. The n. sp. is very interesting by the combination of features of apparently widely different species, and appears to be intermediate between two groups.

Explanation of Plate VIII.

Figs. 1, 2, 3. *Ashmunella kochii* Clapp. Type, No. 5765, coll. G. H. Clapp. Description on p. 77.

Fig. 4. *Bifidaria clappi* Sterki. Cotype, Knoxville, Tenn., No. 98279, A. N. S. P. Description on p. 108.

Figs. 5, 6. *Holospira bartschi* P. & C. Two cotypes, coll. A. N. S. P. and G. H. Clapp. Description on p. 114.

Fig. 7. *Bifidaria bilamellata* Sterki & Clapp. Front view of a cotype, No. 98268, A. N. S. P. Description on p. 126.

A SICILIAN COLLECTION.

BY MAXWELL SMITH.

During February and March, 1908, it was my good fortune to spend nearly fifty days on the island of Sicily, and I improved every opportunity which presented itself for mollusk hunting.

Soon after my arrival in Palermo I called upon the Marquis de Monterosato, and obtained from him much valuable information in regard to localities of Sicilian shells. I also viewed his unrivaled collection of Mediterranean shells, which is especially rich in Sicilian species.

After a few weeks in Palermo the following towns were visited in the order named—Girgenti, Siracuse, Taormina and Messina. Excursions were made from each, but at no time were shells taken more than twelve miles from the sea. From the above will be noticed that the northern, southern and eastern coasts were visited; but the interior and western mountains were untouched. The mountains in the west are exceedingly rich in peculiar species, including the most striking of the latticed *Clausilia*. Each mountain and plain on the island contains its own species or group of species.

Monte Pellegrino, above Palermo, supports a rich snail fauna. The mountain is largely composed of perforated limestone, in the recesses of which a large proportion of the land mollusca live. At the base of Pellegrino in the grass live *Helix hamilcaris* Kobelt. Under stones at the base of the cliffs *Ferussacia folliculus* Gron. Half way up the trail *Helix mazzulli* Jan. and *Helix sicana* Fer. first appear and extend nearly to the summit. Within a hundred feet of the summit *Clausilia grohmanniana* Phil., which was rare below, I found in comparative abundance. Near the signal station on the top *Helix macrostoma* Muhlf., one of the few Sicilian *Campylæas*, was discovered in crevices of the rock. Thus these species apparently prefer various elevations above the sea.

The most remunerative season for terrestrial mollusks in Sicily is during November and December, when the rainy season is usually at its height. At this time every wall is said to teem with shell life. But as I found at Girgenti even the dry season is not unpopular with land mollusca. On the first limb of a single almond tree I counted no less than two hundred and fifty specimens of *Helix*. The opercu-

lates though avoid the direct rays of the sun, living under boulders among the ruins. Siracusan land shells adapt themselves to the dry surroundings by living at the edge of the cliffs overhanging the sea.

Upon reaching Taormina and the base of Etna, I was surprised to find the terrestrial mollusca reduced to a minority. The country here reaches the wildest form, deep crevices and small canyons intersect the mountains and the vegetation is luxurious in early spring. The scarcity of land mollusca is accounted for in the prevalence of lava instead of limestone formations, which are so characteristic of the rest of Sicily.

In the vicinity of Taormina a few small permanent streams were explored. In these, under stones, in swiftly running water, two species of *Ancylus* were collected. The fresh-water genera are not well represented on the island; but near Siracuse the Anapo, a small permanent river, supports a few peculiar species. Many of the Sicilian streams after heavy rains are raging torrents, which, under normal conditions, run underground or in the dry season cease. The absence of mud is also unfavorable for molluscan life. The Anapo rises in a pool of considerable depth, is uniform in width throughout, and after many windings empties into the Bay of Siracuse a few miles below its source. Its banks are lined with papyrus, on the roots of which *Amnicola*, *Bithinia* and other small genera live. Of the lakes in the south I visited none, partly because of their inaccessible location, but particularly on account of their unhealthiness The fauna of each is in the main peculiar, if we include extreme variations.

Romagnala, a small town near Palermo, was found an excellent station for marine species. Facing the open sea, the shore combines sand and algae-covered rocks. Over sixty species were secured in a few hours after a storm, the small species in fresh condition and the larger often containing the animal. Two days later the sand had covered the rocks, and it was with difficulty that ten species were secured. At Siracuse the bay yielded a few marine, and the rocky coast many genera not found at Palermo. *Cypræa lurida* L. and *Fusus syracusana* L. are seldom found near shore at Siracuse, but are frequently brought in by the fishermen. The violence of the surf, combined with the absence of drift on the beaches at Taormina, prevented frequent collecting. *Argonauta argo* L. and *Calliostoma conulus* L. occurred, which were not noticed in the north. Being in

close proximity with the Straits of Messina, a number of shells common at Messina were found at Taormina and Giardine.

At Messina there is an excellent market, in which at 5 a. m. each morning a surprising variety of fish are offered for sale. The early start required is amply repaid. The octopus, *Polypus vulgaris* L., is considered as an especial delicacy as food, both in Sicily and Italy.

In preparing the following list I have determined, for condensation, to omit separate annotations. For convenience I have arranged the *Helices* in alphabetical order, excepting *Leucochroa*.

For the identifications I am indebted to Marquis Monterosato, Mr. C. Payton Gwyer, Mr. E. A. Smith, of the British Museum, and for difficult fresh-water species to Mr. Bryant Walker. The Malacological Laboratory, Paris, has also given free use of its valuable library.

Argonauta argo L. Taormina.

Sepia officinalis L. Taormina, Palermo.

Poiretia algira Brug. Taormina, Girgenti.

Daudebardia brevipes Drap. Palermo.

Hyalinia suburbana Mont. Palermo.

Vitrea hydatina Rossm. Palermo.

Leucochroa candidissima Drap. Girgenti.

Helix acuta L., apicina Lam., conica Dr., conoidea Dr., muralis Müll., pisana Müll., squalida Monts. Siracuse.

Helix agrigantina Ad. Girgenti.

Helix andromica Monts. Taormina.

Helix gregaria Ziegl., moesta Parr. Palermo.

Helix aperta Born, hamilcaris Kob., macrostoma, mazzuli Jan., sicana Fér., variabilis Drap., vermiculata Müll. Monte Pellegrino.

Helix florida Ziegl., ingoi Cafici.

Ena pupa Brug. Girgenti, Palermo.

Pupa avenacea Brug., P. philippii, Cantr. Taormina.

Clausilia agrigantina Brug. Girgenti.

Clausilia affinis Ph., C. affinis Ph. var. taurominica Monts. Taormina.

Clausilia familiaris Monts., C. grohmanniana Phil. Monte Pelligrino.

Clausilia septemplicata Phil. Monreale.

Clausilia syracusana Phil. Siracuse.

Rumina decollata Linn. Well distributed.

Ferussacia folliculus Gron. Monte Pelligrino.

Ferussacia vescoi Bgt. Girgenti.
Succinea megalonyxia Bourg. Siracuse.
Succinea pfeifferi Ross. Palermo.
Alexia myosotis Drap. Siracuse.
Ancylus costulatus Kust. Sigone River near Taormina.
Ancylus striatus Q. & G. Above Letojanni near Taormina.
Lymnæa benoiti Bourg., L. palustris Müll. var. anapensis Monts. Anapo, Siracuse.
Lymnæa truncatula Müll. Palermo.
Planorbis cristatus L. Mondello near Palermo.
Planorbis subangulatus Phil. Siracuse.
Physa cyanea Pirajno. Anapo, Siracuse.
Gadinia garnoti Payr. Romagnola.
Actaeon tornatilis L. Bay of Siracuse.
Bulla striata Brug. Romagnola.
Haminea navicula globosa Jeff. Siracuse.
Philine aperta L. Siracuse.
Conus mediterranea Hw. Siracuse, Romagnola.
Mangilia attenuata Monts. Romagnola.
Marginella miliaria L. Romagnola.
Marginella philippii Monts. Siracuse.
Mitra ebenus Lamk. Romagnola, Siracuse.
Fusus pulchellus Phil. Romagnola, Siracuse.
Fusus syracusanus L. Siracuse.
Latirus lignarius L. Siracuse.
Tritonidea orbignyi Payr. Romagnola.
Euthria cornea L. Romagnola.
Nassa cornicula Oliv. Romagnola.
Nassa costulata Ren. var. flavida Monts. Romagnola.
Nassa cuvieri Payr. Romagnola.
Nassa reticulata Lamk. var. nitida Jeff. Siracuse.
Cyclonassa neritea L. Siracuse.
Columbella rustica L., C. scripta L. Romagnola.
Murex brandaris L. Palermo, Siracuse.
Murex edwardsi Payr., trunculus L. Romagnola, Siracuse.
Murex trunculus L. var. portulana Monts. Palermo.
Typhis tetrapterus Bronn. Romagnola.
Lachesis mamillata Risso. Romagnola.
Purpura haemastoma L. Romagnola.

Lotorium cutaceum L. Palermo.
Lotorium reticulatum Beek. Romagnola.
Cassis sulcosa Brug. Siracuse.
Morio echinophora L. Siracuse.
Cypræa lurida L. Siracuse.
Cypræa pyrum L. Palermo.
Cypræa spurea L. Near Taormina.
Trivia europea Monts., T. pulex Sol. Romagnola.
Chenopus pespelicani L. Messina, Siracuse.
Triforis perversus L. Romagnola.
Cerithium mediterraneum Desh. Romagnola.
Cerithium mediteranneum Desh. var., C. vulgatum Brug. Siracuse.
Bittium lacteum Phil. Romagnola.
Vermetus subcancellatus Bivon, V. subdentatus. Romagnola.
Turritella communis Risso. Siracuse.
Littorina obtusata L. var. neritoides L. Siracuse.
Rissoa cimex L. var. turrita Monts., R. monodonta Biv., R. subcostulata Schw. Romagnola.
Rissoa venusta Phil. Siracuse.
Rissoina bruguieri Payr. Romagnola.
Amnicola subcarinata Monts. Anapo, Siracuse.
Bithinia anapensis Benoit. Anapo, Siracuse.
Cyclostoma elegans Müll. var. villicum Monts. Monreale, Palermo, Siracuse, Taormina.
Cyclostoma siculum Sowb. = costulatum Ziegl. Girgenti.
Pomatias paladilhianus S. Simon. Monte Pelligrino.
Natica millepunctata Lamk. Romagnola, Tamorina.
Natica josephinæ Risso. Romagnola.
Scala communis Lamk. Romagnola, Siracuse.
Odostomia polita Bivon. Romagnola.
Eulima boscii Payr. Romagnola, Siracuse.
Neritina fluviatilis L. Anapo, Siracuse.
Neritina meridionalis Phil. Siracuse.
Neritina viridis L. Romagnola.
Phasianella pulla L. Romagnola.
Phasianella punctata Mich. Siracuse.
Leptothyra sanguinea L. Siracuse.
Astralium rugosum L. Taormina.
Trochus turbinatus Born. Romagnola.

Clanculus cruciatus L. var. rosea Monts. Siracuse.
Monodonta articulata Lamk. Siracuse.
Gibbula adansoni Payr. Siracuse.
Gibbula divaricata L. Romagnola.
Calliostoma conulus L. Messina, Taormina.
Calliostoma depictum Desh., C. laugieri Payr. Romagnola.
Haliotis lamellosa Lamk. Siracuse, Taormina.
Fissurella gibberula Lamk., F. græca Lamk., F. litoralis Monts., F. neglecta Resh., F. nubecula L. Romagnola.
Emarginula solidula Costa. Taormina.
Patella cærulea L. Messina, Romagnola.
Patella lusitanica Gm. Siracuse.
Ischnochiton polii Phil. Romagnola.
Dentalium novemcostatum Lamk. Romagnola.
Ostrea edulis L. Palermo, Taormina.
Anomia ephippium L. Taormina.
Spondylus gæderopus Lamk. Palermo.
Chlamys multistriatus Poli, C. pes-felis L. Taormina.
Chlamys sulcatus Born. Siracuse.
Chlamys varius L. Palermo.
Lima inflata Chem. Palermo.
Mytilus edulis L. Taormina.
Modiola barbata Lamk. Romagnola.
Arca barbata L., A. lactea L., A. noae L. Romagnola.
Unio requieni Lamk. Anapo, Siracuse.
Cardita calyculata Lamk. Taormina.
Cardium aculeatum L., C. paucicostatum Sowb. Siracuse.
Cardium tuberculatum L. var. Romagnola.
Chama gryphoides L. Romagnola.
Tapes beudanti Payr., T. geographica Gm. Romagnola.
Venus gallina L. Siracuse.
Venerupis iris L. Romagnola.
Donax trunculus L. Romagnola.
Solen vaginoides Lamk. Siracuse.
Mactra corallina L. Mondello.
Lucina lactea L. Messina.
Lucina desmoresti Par. Romagnola.
Tellina tenuis Da Costa. Siracuse.
Gastrana fragilis L. Romagnola.
Solemya mediterranea Lamk. Romagnola.

DREDGING OFF SAN DIEGO, CALIFORNIA.

BY C. W. GRIPP.

During the summer of 1908 the writer made a dredging trip outside of the entrance to San Diego harbor, dredging in from 15 to 60 fathoms of water. The following list includes all the species obtained and also a few deep-water species secured from fishermen. This locality is very rich in molluscan life, especially in smaller forms. Including the *Opisthobranchs* my list of San Diego shells contains over 600 species and varieties. I am greatly indebted to Dr. William H. Dall, Mr. Paul Bartsch and Prof. F. W. Kelsey for assistance in determining doubtful species.

Murex californicus Hds.
" carpenteri Dall.
" festivus Hinds.
" incisus Brod.
" santarosana Dall.[1]
Ocinebra foveolata Hds.
Ocinebra interfossa Cpr.
Ocinebra interfossa muricata Cpr.
Ocinebra interfossa atropurpurea Cpr.
Cuma muricata Hds.
Trophon belcheri Hds.
Trophon triangulatus Cpr.
Fusus kobelti Dall.
Gyrineum californicum Hds.
Chrysodomus aphelus Dall.
Chrysodomus kellettii Fbs.
Nassa cooperi Fbs.
" fossata Gld.
" insculpta Cpr.
" mendica Gld.
" perpinguis Hds.
Mitra lowei Dall.
Mitra maura Swains.
Erato columbella Mke.
Erato vittellina Hds.
Marginella jewettii Cpr.
" pyriformis Cpr.
" regularis Cpr.
" varia Sby.
Olivella biplicata Sby.
Olivella pedroana Conr.
Columbella carinata Hds.
" chrysalloidea Cpr.
" gouldii Cpr.
" guasapata Gld.
" hindsi Rve.
" tuberosa Cpr.
Engina carbonaria Rve.
Amphissa corrugata Rve.
Amphissa versicolor Rve.
Myurella simplex Cpr.
Cancellaria cooperi Gabb.
Cancellaria crawfordiana Dall.
Pleurotoma carpenteriana Gabb.
Pleurotoma perversa Gabb.
Pleurotoma montereyensis Stearns.
Pleurotoma santarosana Dall.
Pleurotoma stearnsiana Raymond.

[1] Six or seven specimens at 17 fathoms.

Pleurotoma tryoniana G abb.[2]
Turris (Surcula) halcyonis Dall.
Drillia empyrosia Dall.
" hemphilli Stearns.
" penicillata Cpr.
Bela grippi Dall n. sp.[3]
Mitromorpha aspera Cpr.
Cythara cranneri Arnold.
Mangelia angulata Cpr.
" fuscoligata Cpr.
" hamata Cpr.
" merita, Gld.
" sculpturata Dall.
" striosa C. B. Ad.
" variegata Cpr.
Conus californicus Hds.
Trivia solandri Gray.
Trivia californica Gray.
Ovula spelta Lam.[4]
Polinices lewisii Gld.
Polinices recluziana Desh.
Lamellaria stearnsiana Dall.
Macromphalina californica Dall.
Crepidula aculeata Gmel.
" adunca Sby.
" dorsata Brod.
Crepidula navicelloides Nutt. In aperture of Polynices.
Crepidula onyx Sby. On Pomaulax undosus.
Capulus californicus Dall. On Pecten diegensis.
Amalthea tumens Cpr.
Scala bellastriata Cpr.
" catalinæ Dall.
" near hemphilli Dall.
" hindsi Cpr.
" lowei Dall.
" retiporosa Cpr.
" sarvinae Dall.
Turritella cooperi Cpr.
Mesalia californica Dall.
Mesalia tennisculpta Cpr.
Vermicularia fewkesi Yates.
Cæcum californicum Dall.
" crebricinctum Cpr.
" magnum Stearns.
" orcutti Dall.
" regulare Cpr.
Eulima bistorta Van.
" micans Cpr.
" rutila Cpr.
" solitaria C. B. Ad.
" thersites Cpr.
Liostraca varians Sby.[5]
Turbonilla castanea Cpr.
" eschscholtzi D. & B.
" kelseyi D. & B.
" laminata Cpr.
" oldroydi D. & B.
" painei D. & B.
" tenuicula Gld.
" torquata Gld.
" tridentata Cpr.
Odostomia americana D. & B.
" amianta D. & B.

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[2] One young shell in dredge. Specimens 90 mm. in length from fishermen.

[3] Ten specimens at 17 fathoms.

[4] Three large specimens at 18 fathoms, new to the Pacific Coast.

[5] A beautiful little brown shell polished like a *Eulima*, which it resembles. Eight specimens dredged at 18 fathoms, new to the California coast.

Odostomia astricta D. & B.
" avellana Cpr.
" delmontensis Bartsch.
" gouldi Cpr.
" helga D. & B.
" nuciformis Cpr.
" straminea Cpr.
Odostomia straminea grippi D. & B. on Haliotis assimilis Dall.
Odostomia straminea insculpta Cpr.
Odostomia valdezi D. & B.
Odostomia virginalis D. &. B.
Pyramidella conica Cpr.
Lacuna unifasciata Cpr.
Fossarus fenestratus Cpr.
Fossarus obtusus Cpr.
Alabina californica Dall.
Bittium asperum Cpr.
" armillatum Cpr.
" esuriens Cpr.
" interfossa Cpr.
" quadrifilatum Cpr.
Seila assimilis C. B. Ad.
Cerithiopsis metaxæ Chiaje.
Cerithiopsis tuberculata Mont.
Triforis adversa Mont.
Rissoina bakeri D. & B.
Rissoina kelseyi Dall.
Barleeia subtennis Cpr.
Rissoa grippiana Dall.
Rissoa reticulata Cpr.
Liotia acuticostata Cpr.
Liotia fenestrata Cpr.
Phasianella compta Gld.
Phasianella pulloides Cpr.
Eulithidium cyclostoma Cpr.
Eulithidium substriatum Cpr.
Pachypoma inæquale Mart.
Pomaulax undosus Wood.
Chlorostoma aureotinctum Fbs.
Chlorostoma pulligo Mart.
Gibbula parcipicta Cpr.
Gibbula optabilis Cpr.
Leptothyra carpenteri Pils.
Leptothyra bacula Cpr.
Turcica caffea Gabb.
Halistyluspupoides Dall.
Halistylus subpupoides Tryon.
Vitrinella complanata Cpr.
Vitrinella subplana Cpr.
Norrisia norrisii Sby.
Calliostoma gemmulatum Cpr.
Calliostoma gloriosum Dall.
Calliostoma canaliculatum parvum Williamson.
Calliostoma supragranosum Cpr.
Calliostoma tricolor Gabb.
Calliostoma turbinum Dall.
Haliotis assimilis Dall.[6]
Haliotis rufescens Swains.
Fissuridea aspera Esch.
Puncturella cooperi Cpr.
Puncturella cucullata Gld.
Emarginula bella Gabb.
Lepidopleurus (Oldroydia) percrassus Dall.
Chætopleura gemmea Cpr.
Callistochiton crassicostatus Pils.
Ischnochiton clathratus Rve.
Ischnochiton cooperi acutior Cpr.

[6] Four live specimens found on rocks hauled up in the dredge. Of *H. rufescens* I got one specimen attached to lobster trap.

Acteon punctocœlatus Cpr.
Tornatina cerealis Gld.
" culcitella Gld.
" harpa Dall.
" inculta Gld.
" planata Cpr.
Volvula cylindrica Cpr.
Cylichna attonsa Cpr.
Bulla quoyi Auct.
Cadulus quadrifissatus Cpr.
Cadulus nitentior Cpr.
Dentalium neohexagonum Pils.
Dentalium vallicolens Raymond.
Siliqua lucida Conr.
Corbula luteola Cpr.
Corbula luteola rosea Williamson
Periploma discus Stearns
Lyonsia californica Conr.
" inflata Conr.
" nitida Gld.
Mactra dolabriformis Conr.
Spisula hemphillii Dall.
Semele pulchra Sby.
Semele rubropicta Dall.
Cooperella subdiaphana Cpr.
Rochefortia tumida Cpr.
Tellina bodegensis Hds.
" buttoni Dall.
" carpenteri Dall.
" idæ Dall.
" modesta Cpr.
" santarosana Dall.
Venerupis lamellifera Conr.
Psephidea ovalis Dall.
Psephidea salmonea Cpr.
Paphia tenuissima Cpr.
Cardium substriatum Conr.
Cardium quadrigenarium Conr.
Protocardia centifilosa Cpr.
Phacoides annulata Rve.
Phacoides approximatus Dall.
Serridens oblonga Cpr.
Crassinella varians C. B. Ad.
Cardita subquadrata Cpr.
Milneria minima Dall.
Venericardia ventricosa Gld.
Nucula castrensis Hds.
Leda cuneata Hanl.
" hamata Cpr
" taphria Dall.
Arca solida Sby.
Glycymeris intermedia Brod.
Modiolus rectus Conr.
Philobrya setosa Cpr.
Lima dehiscens Conr.
Pecten diegensis Dall.[1]
Pecten giganteus Gray.
Monia macroschisma Desh.
Terebratulina caput-serpentis L.
Terebratulina caput-serpentis unguicula. Cpr. 20 fathis.
Terebratalia transversa Sby.
Platidea anomioides Scacchi.
Glottidea albida Hinds.

[1] Several young specimens dredged. Have secured from fishermen several large and beautiful specimens.

NEW MOLLUSKS COLLECTED BY MR. A. A. HINKLEY IN SAN LUIS POTOSI, MEXICO.

BY H. A. PILSBRY.

COELOCENTRUM HINKLEYI, n. sp.

The shell is shortly rimate, imperforate, the lower third or half cylindric, the rest slowly tapering to the truncate summit; rather solid; brown. Sculpture of backwardly arched narrow ribs, much narrower than their intervals except on the last whorl, where they are more slender and closely crowded. There are about 65 ribs on the penultimate whorl. On some of the later whorls the ribs are sometimes weak and rather irregular. The apical breach is closed by a steep, slightly convex plug densely covered with strongly projecting granules. Whorls remaining slightly convex, at least the upper ones have a delicate keel close under the suture; last whorl rounded basally, having a very weak, inconspicuous, spiral basal cord. Last half whorl straightened, produced forward beyond the preceding whorl. The aperture is oblique, rounded ovate; peristome obtuse, narrowly recurved. The internal column is moderately large, its diameter contained 3.7 to 4 times in that of the shell. Within each whorl it is rather strongly obliquely swollen, and typically bears a few oblong granules in place of the obliquely vertical laminæ of typical species of Cœlocentrum.

Length 35, diam. 8.1 mm.; whorls remaining 12.

Length 37, diam. 8 mm.; whorls remaining 13.

Length 35, diam. 8 mm.; whorls remaining 11.

Length 39, diam. 8 mm.; whorls remaining 14.

San Luis Potosi: highest Mt. on south side of river at Mecos Falls, and bluff 3 miles north of San Dieguito.

This is a variable species, represented by many specimens from two localities. In some examples the rather large internal column bears distinct elongated granules; others have low nodes, while still others have whitish lines which project only slightly from the surface of the column.

Five specimens of a series from San Dieguito measure:

Length 46, diam. 8.5 mm.; whorls remaining 18½.

Length 41, diam. 9 mm.; whorls remaining 12½.

Length 38.5, diam. 7.7 mm.; whorls remaining 15½.

Length 36.5, diam. 8.7 mm.; whorls remaining $12\frac{1}{2}$.

Length 32, diam. 8.2 mm.; whorls remaining $10\frac{1}{2}$.

At the Mecos Falls locality there is a small, slender form occurring with the types, having only very slight, hardly noticeable nodes on the spiral swelling of the axis. The aperture is carried forward further than in the typical examples. Two of these measure:

Length 35, diam. 7.1 mm.; whorls remaining $12\frac{1}{2}$.

Length 32.2, diam 7.1 mm.; whorls remaining 12.

Cælocentrum ischnostele, n. sp.

The shell is shortly rimate, imperforate, the lower half cylindric, upper half slowly tapering to the truncate summit; thin; pale brown. The surface has a silky luster, and is densely sculptured with thread-like ribs, which arch backward, and are about as wide as their intervals except on the last whorl, where they are finer and more closely crowded. On the penultimate whorl there are about 90 (88 to 92) ribs. The breach at the summit is closed by a very convex, granulose plug. Remaining whorls $11\frac{1}{2}$ to $14\frac{1}{2}$, slightly convex, having a minute carina below the suture and very close to it. The last whorl is convex and has a scarcely noticeable basal cord; its last half is straightened, and projects shortly (about $1\frac{1}{2}$ mm.) forward. The aperture is oblique, rounded-ovate, the upper margin straightened. Peristome obtuse, narrowly recurved throughout. The internal axis is very slender throughout, weakly sinuous within each whorl, smooth, its diameter contained $8\frac{1}{3}$ times in that of the shell. It opens by a minute perforation at the summit.

Length 32, diam. 6.8 mm.; $13\frac{1}{2}$ whorls remaining.

Length 32.8, diam. 6.2 mm.; $14\frac{1}{2}$ whorls remaining.

Length 30, diam. 6.5 mm.; $11\frac{1}{2}$ whorls remaining.

Length 27.8, diam. 6.4 mm.; 12 whorls remaining.

Length 27.8, diam. 6.2 mm.; $11\frac{1}{2}$ whorls remaining.

This form occurred in the same locality with *Streptostyla bartschi*, near Mecos Falls. It stands close to the preceding species, but differs by its much more numerous ribs, the much more slender internal axis, and the last whorl does not run forward so far. It is remarkable for the small size of the internal column.

In a young shell 11 mm. long with $14\frac{1}{2}$ whorls the first $1\frac{1}{2}$ whorls forming the hemispherical summit are perfectly smooth and measure $1\frac{1}{3}$ mm. in diameter. Then very fine very short riblets appear

below the suture, and to the 6th whorl the caliber of the shell decreases slightly. Beyond this the caliber increases slowly, and the riblets gradually become longer, though a smooth band persists along the middle of each whorl as far as about the 16th whorl, after which the ribs are continuous.

The above forms, with others, will be figured in a future report on the shells collected by Mr. Hinkley.

A NEW SPECIES OF LYMNÆA.

BY FRANK C. BAKER.

LYMNÆA HENDERSONI n. sp.

Shell globose, very thin and fragile; periostracum light yellowish or brownish-horn; surface dull; sculpture of fine growth-lines, without spiral lines; whorls $3\frac{1}{2}$, very rapidly increasing in diameter, the body whorl seven-eighths the length of the entire shell, very globose; spire very short, depressed, dome-like, the first two whorls flat and coiled in the same plane so that a profile view shows only two full whorls. Nuclear whorls flat, partly concealed by the volutions of the spire; sutures impressed; aperture round or roundly elliptical; outer lip thin; inner lip broad, triangular, reflected over the columellar region, but leaving a deep, well-marked chink; the inner edge of the inner lip is usually bent downward near the body whorl, partly concealing the umbilical chink; parietal callus thin; axis smooth, hourglass-shaped.

Length 7.00, breadth 5.50; aperture length 4.75, breadth 3.00 mm.

Length 6.25, breadth 5.00; aperture length 4.00, breadth 2.50 mm.

Length 6.75, breadth 5.00; aperture length 4.80, breadth 3.00 mm.

Length 5.50, breadth 4.10; aperture length 4.00, breadth 2.50 mm.

Types: Chicago Academy of Sciences, six specimens, No. 24534; Co-types: University of Colorado, Boulder, Colo.

West of Fort Collins, Laramie county, Colo.

Ecology: Inhabits lagoons and intermittent bodies of waters. Judge Henderson writes of the habitat as follows: "I am informed that there had been no water in the lagoon for many months, probably since last summer or autumn. The ground was cracked to a depth of several inches and the mollusks were found down in the cracks in the mud. Therefore, it seems to be another species capable of æstivating."

Remarks: This species was at first thought to be *Lymnæa sonomaensis* Hemphill, but a comparison with that species shows that the present species differs not only from *sonomaensis*, but from all related species in the form of the spire and aperture. The first two whorls of the spire are coiled in the same plane, producing an abruptly truncated appearance. The inner lip is triangular and not evenly rounded as in *techella* and its varieties, but similar to that of *bulimoides*, from which it differs in its truncated spire. The only form likely to be confounded with *hendersoni* is *sonomaensis*, which differs in the form of the spire and inner lip.

I take great pleasure in dedicating this interesting species to Judge Junius Henderson, of the University of Colorado.

SPHÆRIUM PILSBRYANUM, N. SP.

BY V. STERKI.

Mussel large, high, inequipartite, oblique, well inflated; beaks rather large, rounded, prominent, inclined towards the anterior; upper margin strongly and regularly curved in the adult, less so or nearly straight in young specimens, ventral margin rather well and regularly curved; anterior part of the mussel much smaller than the posterior, its outlines rounded or slightly truncate, posterior rounded or truncate obliquely, the end rather drawn downward, rounded or subangular; surface with rather coarse to medium, sharp, concentric striæ, regular over the beaks, less so over the balance of the valves, and with about six to eight impressed lines of growth, deepest posteriorly, with the interstices somewhat bulging; color chalky-whitish to light or deep gray, in some specimens with alternate zones of light and dark; shell thick; muscle insertions slightly marked, large, not impressed; hinge strong, plate moderately broad, rather long; cardinal teeth small, rather typically to irregularly formed, the posterior of the left valve often wanting or rudimentary; laterals rather large, those of the right valve projecting inward, those of the left only slightly so; anterior short, the left raised cusp-like, the posterior all rather long, not raised to cusps.

Long. 18, alt. 16, diam. 11–12 mm.; average; the largest, 21 mm. long.

Fossil, in pleistocene or possibly later deposits on the shore of Bear Lake, Utah, collected by the Hayden Survey, in company with *Planorbis trivolvis* Say (var.), *Carinifex newberryi* Lea, *Lymnæa utahensis* Call, and *Fluminicola fusca* Hald. There are about 200 valves in the lot, including one right and one left of rather small juv. The specimens are in the collection of the A. N. S. P., No. 62825.

This *Sphærium* cannot be ranged under any of the described recent species. Of about the same length with *S. sulcatum* Lam., the mussel is of very different shape and appearance: much higher, much more inequipartite, the beaks are much narrower and more prominent; the shell and hinge are stronger. It resembles more some forms of *S. aureum* Pr. (resp. forms ranged under that species), but is larger, more inequipartite and oblique.

It is worthy of notice that in numerous specimens the hinges are partially or wholly reversed, just as in most of our recent species of this group, and the posterior cardinal tooth of the left valve is wanting or rudimentary, in some specimens well enough preserved to show such details. So far as can be seen from a few fresher, not chalky, specimens, the color was whitish or reddish to grayish, and the surface shining.

The species is named in honor of Dr. H. A. Pilsbry, to whom I am indebted for the opportunity of examining this fine lot of fossils.

NOTES.

Note on *Pholadomya pacifica* Dall. This species was first diagnosed in the Smithsonian Miscellaneous Collections, Quarterly Issue, July, 1907, no. 1727, p. 172. The fuller description and account which appeared in the March number of the NAUTILUS (1909) had been prepared and sent to the editor in May, 1907, as the publication of my paper in the Quarterly was then indefinitely delayed. As I saw no proofs of the NAUTILUS issue, this fact is not stated in it, but I now make the correction. Since both notices were prepared, another complete specimen in excellent condition was discovered in the Albatross collection, but unfortunately, though fresh, it did not contain the soft parts. The presence of a resilium was confirmed. The localities of the two dredgings have been received.

They are station 4904, near Nagasaki, in 107 fathoms, sand and shell, bottom temperature about 53° F., and station 4807, off Hakodate, in 44 fathoms, gravel, temperature about 45° F., judging from that at nearby stations. The fresh specimen is of a creamy white, faintly pearly internally. I may add that the two species of alleged *Pholadomya*, referred to in the text of the NAUTILUS article, are now considered to belong to the genus *Panocca* (Dall, 1905) with several others dredged in the deep waters of the Atlantic.—WM. H. DALL.

MR. L. V. DALTON, in the Quarterly Journal of the Geological Society (London), lxiv, Nov. 1908, p. 631, records *Busycon canaliculatum* (L.) from the Miocene of Burma. His figure will scarcely convince skeptical American conchologists. From what we know of the geological history of the shell in question and its allies, and taking into consideration the fact that the veliger stage in *Busycon* (*Fulgur*) is passed through inside the egg-capsule, and hence it has no free swimming period, a record of its distribution half round the earth needs better evidence than Mr. Dalton is satisfied with.

SHELLS OF AROOSTOOK COUNTY, MAINE.—Dr. V. Sterki has this winter examined a part of my collection of small land shells, and the result of his labor has been the identification of the following additions to those already reported from Aroostook county, Maine:

Strobilops affinis Pils.
Vertigo ovata Say.
Vertigo nylanderi Sterki.
Euconulus chersinus Say.

All the above were collected in the town of Woodland.—OLOF O. NYLANDER.

The oyster is cool and clear and calm,
  Admired by the many and not the few;
Yet, sorry to say, possesses a way
  Of getting himself in a stew.

ERRATA.—Numbers 8, 9 and 10 of Vol. xxi were marked by error " Vol. xxii " on the date lines, pages, 85, 97, 109, but not on the cover of those numbers. This note is published to obviate errors in binding Vol. xxi.

The following corrections should be made in Vol. xxii:

P. 47, end of line 4, delete 7.

P. 78, 7th line from foot, for plate vi, read vii, viii.

P. 82, top line, for NAUTILUS xxii, read xxi.

P. 101, under *Quadrula coccinea*, in place of "*Found gravid on June 18*," *etc.*, it should read: *Found gravid by the writer on June 18, '08, in Neshannock Creek, Lawrence Co., and received gravid from the Allegheny River, McKean Co. (collected by Mr. Dennis Dally on June 22, '08).*

THE marriage is announced of Miss Elizabeth J. Letson, Director of the Buffalo Academy of Natural Science, to Mr. William Alanson Bryan, of the Pacific Institution of Science, on March 16th. Mr. and Mrs. Bryan will be at home in Honolulu after May 4th.

DR. V. STERKI is spending the month in studying *Sphærium* and *Pisidium* in the museums of Boston, Cambridge, Philadelphia and Washington.

MR. A. A. HINKLEY, who returned from a collecting trip in Mexico last month, reports good collecting, especially in freshwater mollusks.

AN interesting biographical memoir of William More Gabb, the palaeontologist and conchologist, read by Dr. W. H. Dall at the November meeting of the National Academy of Sciences, has just been published. A bibliography of Gabb's scientific works is appended.

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